

**City of
Milwaukee
Cross-
Connection
Manual**

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FORWARD

CROSS CONNECTION MANUAL

This manual was created for the purpose of assisting plumbing inspectors in identifying cross connections and ordering proper backflow protection. The contents of this manual were obtained and compiled in Oct. 2012. The most current revision is July 2020 with further updates to be noted. All information is considered current to this date and existing codes, at that time.

This manual is subject to additions, changes or corrections at any time per The City of Milwaukee Department of Neighborhood Services Plumbing Division or the Milwaukee Water Works.

This manual contains product names & model numbers for specific devices. It is in no way an endorsement of product or manufacturer. All devices must meet A.S.S.E. & A.S.M.E. Standards for their particular application.

This document is not code language and should not be considered as such. This is a reference document only.

CROSS CONNECTION CONTROL PROGRAM

The function of the cross connection control program is to protect the drinking water of the City of Milwaukee from possible sources of contamination. The Cross Connection program is administered by the Milwaukee Water Works with DNS Plumbing Inspectors conducting surveys and ordering corrections. At this time inspections are only being done on commercial, multiple family and industrial properties on a five (5) and two (2) year cycle. This program is funded by the Water Department. The program was established in 2005. Contact is Chris Krowski, Supervisor, at 286-8221.

A toilet can be a source for a cross connection

The toilet fill valve (ballcock) can be submerged below the water overflow line or a non-approved fill valve installed. Both situations can cause a cross connection.



What does this inspection entail?

A survey is required by the State of Wisconsin on all Commercial and Multi-family buildings, to look for the possible interconnection of potable (drinking) water and contaminated sources. This is a City required inspection. The inspector will have to follow the water lines to where ever they run. Therefore, they may need access to the entire building.

Action to take

- Read and understand this brochure
 - Inspect hose connections on your house for proper back flow protection. (outside hose faucet and Laundry sink.)
 - Call a plumber with questions on back flow protection for boiler or plumbing fixtures and appliances.
 - Questions about cross connection or backflow issues call the Dept. of Neighborhood Services Cross Connection Section at 286-3361
- Monday - Friday 7:30 A.M. - 3:30 P.M.

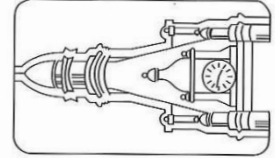


Protect Your Drinking Water

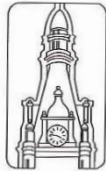


CAUTION!

Your garden hose may be hazardous to your health. Learn how unprotected water can be a serious public health threat!



**City of
Milwaukee
Department of
Neighborhood
Services**



Department of
Neighborhood Services
Plumbing Section
841 N. Broadway Rm 104
Milwaukee Wi. 53202
(414) 286-3361
www.milwaukee.gov/dns

What is the most common form of a cross connection?

Locally, the ordinary garden hose is the most common offender as it can be easily connected to the potable (drinking) water supply and used for a variety of potentially dangerous applications.

What is Backflow?

Backflow occurs when the flow of water, in any pipeline or plumbing system, reverses and flows in the opposite direction than intended. The normal direction of water flow is from the utility water main to the homes or businesses. The backflow of water from home plumbing systems into the community's drinking water sometimes results from a pressure source, like a well pump. Signs of contaminated water range from water that is off-color and undesirably odorous to water that contains health threatening and even life threatening toxins.

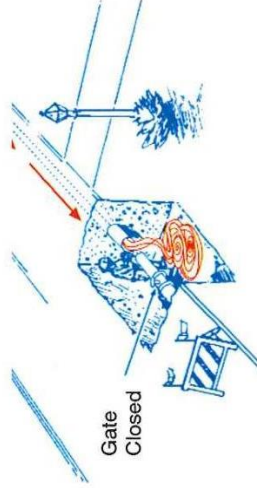
What is potentially dangerous about an unprotected hose faucet?

The purpose of a hose faucet is to allow easy attachment of a hose for outside watering purposes. However, garden hoses can be extremely hazardous because they are left submerged in swimming pools, laid in elevated locations (above the hose faucet) when watering shrubs, attaching chemical sprayers to hoses for weed-killing, etc.; and hoses are often left laying on the ground, which may be contaminated with fertilizer, cesspools, and garden chemicals.



What protection is required for a hose faucet?

A hose faucet vacuum breaker should be installed on every hose faucet to isolate garden hose applications thus protecting the water supply from contamination.



Backflow can occur if there is a pressure drop in a water supply system because of a pipe break in a water main or an opened hydrant, for testing or fire fighting .

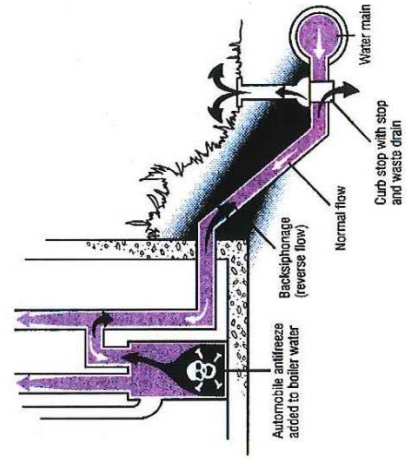


Fertilizer, weedkiller, or something worse, can be sucked into water meant for your family. If someone drinks, cooks or bathes in contaminated water, it can cause serious illness or death.



What is a cross connection?

A cross connection is a direct arrangement of piping which allows the potable (drinking) water supply to be connected to one which contains a contaminant. An example is the common garden hose attached to a hose faucet with the end of the hose laying in a cesspool. Other examples are a garden hose attached to a service sink with the end of the hose submerged in a tub full of detergent, supply lines connected to bottom-fed tanks and supply lines to boilers.



MILWAUKEE WATER WORKS CROSS CONNECTION CONTROL PROGRAM

INTRODUCTION

The Milwaukee Water Works (MWW) has established a cross connection control program in accordance with the Wisconsin Department of Natural Resources Administrative Code NR 810.15 and Professional Services Administrative Code SPS 382.41. This program is designed to support public health and safety, by minimizing potential contamination of the public water supply. This report outlines the programmatic elements designed to establish administrative code compliance and manage contamination risks.

As a programmatic base, a cross connection is defined as “an actual or potential connection between any part of a potable water system and an environment that would allow substances to enter the potable water system. Those substances could include gases, liquids, or solids, such as chemicals, water products, steam, water from other sources (potable or non-potable), and any matter that may change the color or taste of water or add odor to water.”¹

REGULATORY ALIGNMENT

The authority to perform and enforce a local cross connection control program is codified in the City of Milwaukee Code of Ordinances 97-12, which aligns with NR 810.15, as well as SPS 382.41.

PERSONNEL DEVELOPMENT AND LICENSURE REQUIREMENTS

All personnel assigned to perform cross connection inspections will hold state certified plumbing licensure, per NR 810.15. Additionally, MWW will require all inspectors to complete the following trainings, as well as maintain any required retraining/certifications:

- Master or Journeyman Plumbers License
- Cross Connection Control Tester Registration
- Commercial Plumbing Inspector Certification

¹ “American Water Works Association Documents.” American Water Works Association. Accessed 2020.
<https://www.awwa.org/Portals/0/publications/documents/M14LookInside.pdf>.

Further, for all cross connection inspectors, the following in-house trainings will be required, with associated retraining, and proof of successful completion:

- Any and all continuing education for the required certifications listed above
- Inspection Tablet Use 101
- Any and all trainings and certifications required by the City of Milwaukee's Department of Employee Relations (DER)

SURVEYS

The cross connection program will, operationally, treat single-family and duplex-residential properties differently than multi-family, commercial, public authority, and industrial properties, given their differing risk profiles.

The following sections outline the operational differences:

Single-Family and Duplex Residential Properties:

MWW is responsible for performing the cross connection control survey. During each water meter exchange performed on a 20-year frequency, MWW staff will survey fixtures that are visible during the meter exchange. The field technician will provide the occupants of the building a copy the cross connection public education materials and provide two hose bib backflow preventers at no cost for the resident to install if needed.

Multi-Family, Commercial, Public Authority, and Industrial Properties:

The Department of Neighborhood Services (DNS) and MWW will work in tandem. DNS will focus on program operations and MWW will focus on program analysis. More specifically, DNS will perform all multi-family, commercial, industrial, and public authority (owned) cross connection inspections on behalf of MWW and MWW will provide DNS program analysis to support program/inspection operations.

DNS will perform the following program operations:

1. Maintain sufficient staffing to sustain cross connection control inspection compliance
2. Maintain proper education and training for inspection staff
3. Use provided program analysis to inform and strengthen evidence-based program operations

4. Operate as compliance authority, when needed

Additionally, DNS will adhere to the following protocol with all multi-family, commercial, industrial, and public authority properties:

1. Send a notification letter indicating an inspection is required/due within the next 30 days
2. Property owner must schedule inspection by internet or phone
3. Complete inspection, per standards
4. Notify property owner if cross connection remediation is required. The notification will provide the customer with the required compliance timeline for each identified violation

INSPECTION FREQUENCIES

Inspection frequencies will be based on a property risk evaluation, with multi-family and condominium properties without boilers placed on a five-year cycle, and all other multi-family, commercial, industrial, and public authority properties placed on a two-year cycle.

Residential Customers:

Single-family and duplex customers will be surveyed a minimum of once every 20 years, on a schedule matching meter replacement with public education materials provided no less than every three years and at the time of the meter exchange.

Multi-Family, Industrial, Commercial, and Public Authority Customers:

Multi-family, industrial, commercial, and public authority customers will be inspected once every two years, at a minimum, unless the property is a multi-family or condominium without a boiler and thus placed on a five-year inspection cycle.

Inspection Frequency Adjustments:

Utility and/or inspection staff may determine an individual property's cross connection risk to be no greater than a typical residential customer and assign the property to a 20-year inspection cycle, subsequent a contamination risk evaluation.

Additionally, MWW may to request of the Wisconsin Department of Natural Resources (WDNR) an inspection frequency adjustment of a property class subsequent a risk evaluation of said property class.

PROTECTIVE DEVICES

The cross connection control program will adhere to all methods, devices, and assemblies to protect against cross connection hazards as stipulated in MCO 97-12.6(d), SPS 382.41, Wisconsin Administrative Codes, as well as the backflow prevention and cross connection recommendations in the American Water Works Association's (AWWA) M14 Manual.

CUSTOMER CROSS CONNECTION COMPLIANCE

Customers will be required to establish cross connection compliance in a timely manner, relative to the significance of the existing hazard:

Per MCO 97-12.9(b), connections posing an imminent danger to public health will be immediately disconnected, with the disconnection maintained until required protective compliance measures have been made and certified.

Cross connection hazards not meeting the imminent danger to public health standard will be required to perform the outlined needed corrections within 30 calendar days.

Additionally, per MCO 97-12, in the event access is denied after reasonable notice to any premises where an unprotected cross connection exists or a property requiring inspection provisions are denied, discontinuance of water service can commence, per the following access escalation process:

1. Upon being denied access to a property for a reasonable amount of time and notice, pursuant MCO 97-12.9(a), the property owner is afforded due process by petitioning for a hearing through the Administrative Review Appeals Board, as outlined in MCO 320-11. MWW will engage in said process in the event the property owner avails himself or herself of this option.
2. Given the Administrative Review Appeals Board affirms MWW's position, MWW will discontinue water service up until the point the property owner provides a Cross Connection Control Inspector access

to the property sufficient to conduct a full Cross Connection Control inspection.

In instances when the property owner decides not to avail themselves of processes provided by the Administrative Review Appeals Board, MWW will follow the following process and protocols when the circumstances above are present:

Day 0

Notice to customer (owner and property) at least ten days prior to disconnection with all information required by the Public Service Commission (PSC) and any other regulatory agencies or bodies. In addition, a copy of associated letters will be posted at each unit door.

Day 5

Warning tag/notice will be placed on the property (for each unit) reminding tenant/occupant of upcoming disconnection.

Day 10

This being the first day disconnection can occur; reasonable effort will be made to rectify the issue (i.e. attempt to gain access) before disconnection. In the event water service cannot be disconnected, MWW will provide an extra notice reminding the property owner of the upcoming turn off.

Day 20

This is the last day disconnection can occur, except in certain circumstances. If past the twentieth day, disconnection can still occur if the MWW leaves a notice at the property 24 hours before disconnection is to occur. MWW has up to 48 hours from the time the notice was left on the property to complete the disconnection.

In the event the following circumstances are applicable, the corresponding protocols will be followed:

- Service will not be disconnected on a day immediately preceding a day when the business offices of the utility are unavailable to the public for purposes of transacting all business matters unless the utility provides personnel readily available to the customer 24 hours per day to evaluate, negotiate, or otherwise consider the customer's objection to the disconnection and have personnel available to restore service 24 hours per day.
- Heat Advisory:

- The utility will not disconnect service in affected counties when a heat advisory, heat warning, or heat emergency has been issued by the National Weather Service
- Date Restrictions:
 - In the event water service is necessary component of the property's heating system, the utility will not disconnect an occupied, residential dwelling during the period November 1 to April 15.
- Medical:
 - The utility will postpone service disconnection, or reconnect service in the event service has been disconnected for 21 days if the occupant produces a Wisconsin Physician's Statement of Licensure statement or notice from a public health, social services, or law enforcement official. This statement/notice must identify the emergency medical or protective services with specific time periods during which service disconnection would aggravate said services.
- Dispute:
 - In the event a customer disputes the disconnection, either directly or through the PSC, the utility will investigate any disputed issue and attempt to resolve said issue. During the investigation, utility services will not be disconnected over these matters.

TESTING

All cross connection control assemblies and devices will be maintained and tested in accordance with SPS 382.41 and the Wisconsin Administrative Code.

Record Keeping

MWW will use the testable devices record keeping provided within the State of Wisconsin's ESLA system as not to duplicate efforts, as well as align with state governmental efforts.

LIST OF BACKFLOW PROTECTION

CROSS CONNECTION CONTROL DEFINITIONS

BACKFLOW: the unwanted reverse flow of liquids, solids or gases.
(SPS 381.01(16), Wis. Adm. Code)

BACK PRESSURE: a pressure greater than the supply pressure that may cause backflow. (SPS 381.01(17), Wis. Adm. Code) **BP**

BACK SIPHONAGE: the creation of a backflow as a result of a negative pressure.
(SPS 38J.01(19), Wis. Adm. Code) **BS**

CONTAINMENT: the installation of a cross connection control method, device or assembly to prohibit the flow of contamination from a building or facility into a water supply system. (SPS 381.01(61m), Wis. Adm. Code)

CONTINUOUS PRESSURE: a pressure greater than atmospheric and exerted for a period of more than 12 continuous hours.
(SPS 381.01(62m), Wis. Adm. Code) **CP**

CROSS CONNECTION: a connection or potential connection between any part of a water supply system and another environment containing substances in a manner that, under any circumstances, would allow the substances to enter the water supply system by means of back siphon age or back pressure. (SPS 381.01(65), Wis. Adm. Code)

HIGH HAZARD: a situation where the water supply system could be contaminated with a toxic substance or solution so as to make the water unsuitable for the designated use.
(SPS 381.01(120), Wis. Adm. Code) **HH**

ISOLATION: providing individual backflow protection at each point of use.

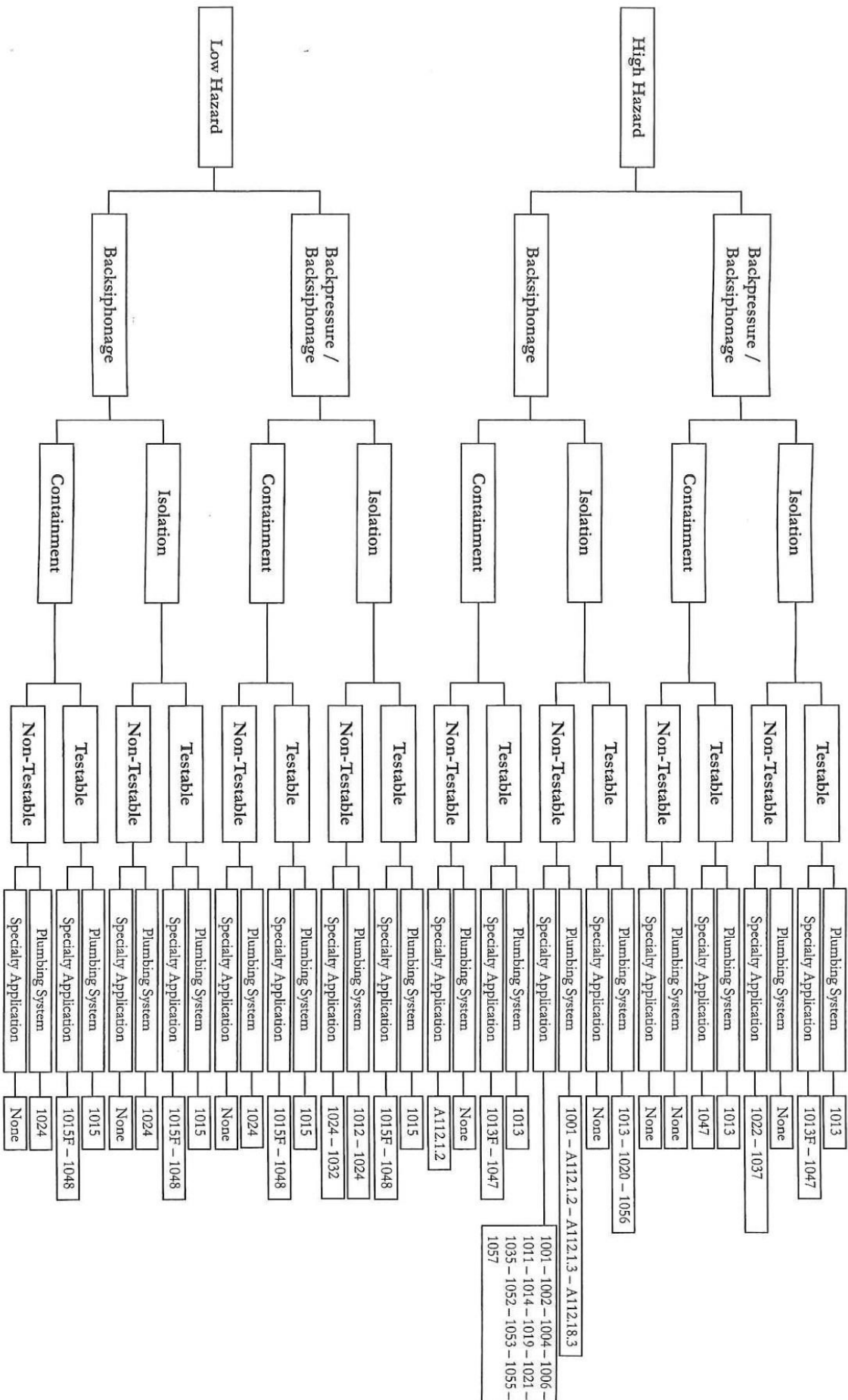
LOW HAZARD: means a situation where the water supply system could be contaminated with a nontoxic substance or solution so as to make the water unsuitable for the designated use.
(SPS 38J.01(147), Wis. Adm. Code) **LH**

NONCONTINUOUS PRESSURE: a pressure greater than atmospheric and exerted for a period of no more than 12 continuous hours.
(SPS 381.01(147), Wis. Adm. Code) **NCP**

NON-TOXIC: a substance in the diluted form that meets one of the following requirements: (a) Is listed by the National Sanitation Foundation (NSF) as meeting the NSF evaluation criteria for nonfood compounds.
(b) Is acceptable to the United States Food and Drug Administration (FDA) Title 21 section 175.300 of the Federal Regulation on Food Additives.
(c) Is acceptable for contact with potable water or is deemed non-toxic by a third party certification that is acceptable to the department.
(d) Is deemed non-toxic by the department.
(SPS 381.01(163), Wis. Adm. Code)

NO VALVES ALLOWED DOWNSTREAM: valves are not allowed downstream of the device or assembly. This is true for devices that do not allow continuous pressure **No VDS**

STANDARDS REFERENCE GUIDE



DEVICE TYPES

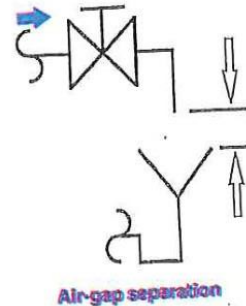
ASSE 1012 – Low degree of Hazard – Dual Check with Atmospheric Vent

- a. For continuous pressure to a maximum of 150 pounds of back pressure
- b. Typical for boilers not treated or containing chemicals and less than 15 pounds steam or 30 pounds water
- c. Lead-free requires on potable water.



ANSI 112.18.3 – Air Gap

- a. Two (2) times the inside diameter of pipe feeding.



ASSE 1015 – Low degree of Hazard - Double Check Assembly

- a. For continuous pressure to a maximum of 150 pounds of back pressure
- b. Typical for Fire protection Systems that are water based with no treatment or containing chemicals.
- c. Testable annually



DEVICE TYPES (CONT)

ASSE 1001 – High degree of Hazard – Atmospheric Vacuum Breaker

- a. For non-continuous pressure (No more than 12 hours in a 24 hr. period)
- b. Apply six (6) inches above flood level rim or maximum point of use
- c. No valves permitted downstream and no back pressure.



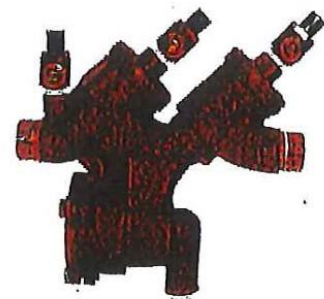
ASSE 1011 – High degree of Hazard – Hose Connection Vacuum Breaker

- a. Use only downstream of Faucet or Hose Bibb.
- b. For non-continuous pressure (See a above) except for campgrounds and marinas.
- c. Maximum 10 feet of head pressure
- d. No valves downstream



ASSE 1013 – High degree of Hazard – Reduced Pressure Zone Backflow Assembly Typical

- a. For all cross connections subject to back pressure or back siphon age
- b. Testable annually
- c. Required to be registered with State of WI.



Device Types (cont.)

ASSE 1020 – High degree of Hazard – Pressure Vacuum Breaker Assembly

- a. Must be installed at least twelve (12) inches above flood rim.
- b. Testable annually
- c. Outside only
- d. No back pressure allowed
- e. State of WI registration



ASSE 1022 – Dual check with Atmospheric vent

- a. Used of carbonated beverage, juice dispenser, coffee and espresso/cappuccino machine with less than 15 pounds (1 bar) steam pressure or 30 pounds of water pressure
- b. Beverage dispensers only



ASSE 1035 – High degree of Hazard - Lab Faucet Vacuum Breaker

- a. Protection of lab faucets with a serrated nipple or hose threads.
- b. Maximum of six (6) feet of head pressure
- c. No valves downstream.



Device types (cont.)

ASSE 1052 – High Degree of Hazard – Hose Connection Vacuum Breaker

- a. For use downstream of faucet or hose bibb
- b. Maximum 10 feet head pressure
- c. No valves downstream.
- d. Non continuous pressure



ASSE 1056 – High degree of Hazard – Spill Resistant Vacuum Breaker

- a. Must be installed at least twelve (12) inches above flood rim.
- b. Testable annually
- c. State of WI registration
- d. No backpressure allowed



**BACKFLOW PREVENTER DISCHARGE RATES
AND RECEPTOR DISCHARGE RATES**

INLET QUANTITY OF DISCHARGE (GPM)						
INLET SIZE	@ 30 PSI	@ 40 PSI	@ 50 PSI	@ 60 PSI	@ 70 PSI	@ 80 PSI
1/2	28.5	31.6	35.3	38.7	41.8	44.7
3/4	64.1	71.1	79.5	87.1	94.1	100.6
1	113.9	126.4	141.4	154.9	167.3	178.8
1-1/2	256.3	284.5	318.1	348.4	376.3	402.3
2	455.6	505.7	565.4	619.4	669.0	715.2
3	1025.1	1137.9	1272.2	1393.7	1505.3	1609.2
4	1822.5	2023.0	2261.8	2477.6	2676.1	2860.8
6	4100.5	4551.7	5089.0	5574.7	6021.3	6436.8

★ OUTLET SIZE/SPILL LEVEL RELATIONSHIP				
OUTLET SIZE	SPILL LEVEL ABOVE OVERFLOW			
	6"	12"	18"	24"
2"	37.4	52.6	64.5	74.5
3"	83.8	118.5	144.2	167.6
4"	149.0	210.7	258.1	298.0
6"	335.2	474.1	580.7	670.5
8"	596.0	842.8	1032.3	1192.0
10"	931.2	1317.0	1613.0	1862.5
★ GIVEN IN GPM - QUANTITY OF DISCHARGE				

AREA OF A CIRCLE (SQ. IN)	
2"	3.14
3"	7.10
4"	12.36
6"	28.26
8"	50.24
10"	78.50

PARTIAL LIST OF BACKFLOW PROTECTION

AIR GAP ASME A112.1.2 AIR GAP FITTING ASME 112.1.3

The best form of backflow protection for high and low hazard applications. As defined by SPS 381.01(7), means the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe of faucet supplying water to a tank or plumbing fixture and the flood level rim of spill level of the receptacle.

ASSE 1001

Atmospheric Vacuum Breaker (AVB). For high hazard cross connections **not** subject to continuous pressure. Apply 6 inch min. above flood level rim. On deck mount, 1 inch above flood level rim with approved faucets. Found on process tanks, dishwashers, soap dispensers, washing machines, lawn sprinklers, hand held showers, pools, etc.

Atmospheric vacuum breaker is used when shut off valves or zone controls are **NOT** found downstream.

ASSE 1011 & 1052

Hose connection vacuum breakers and hose connection backflow preventers. May use in campgrounds and marinas with continuous pressure. Use only downstream of faucet or hose bibb. Maximum 10 feet of head pressure. Hydrants that have bleeds into the ground and/or are flush with grade or below are **prohibited**. May not be used more than 12 hours. **No valves downstream of device**. Limited to the discharge side of control valve.

ASSE 1012

Backflow preventer with Intermediate Atmospheric Vent. Cross connection subject to backpressure or backsiphonage where there is a low hazard. Continuous pressure. Maximum 150 psig of backpressure. Residential boilers, which are not treated or contain chemicals, small cooling towers,

autoclave sterilizer (less than 15 pounds steam or 30 pounds water with no toxic chemicals. Also found on humidifiers and proofing ovens.

ASSE 1013

This is a Reduced Pressure Zone Backflow Preventer (RP). All cross connections subject to backpressure or backsiphonage where there is a high potential of contamination. Continuous pressure. You find these in main water supply lines, commercial boilers, hospital equipment, laboratory equipment, waste digesters, car washes, etc. If a RP is located within a building, a drain or receptor shall be provided to receive the discharge from the vent port.

ASSE 1014

Hand held shower. Faucet needs to meet **ASME A112.18.1** which includes backflow protection. Max. 5 ft. of head and no valve downstream of backflow preventer.

ASSE 1018

Serves a trap primer only. This Atmospheric Vacuum Breaker is installed such that the bottom of critical level marked on the device, is at least **12 inches above** the following: The connection to the trap and the highest point downstream where backpressure would be created.

ASSE 1019 A, B AND C (HAS ALTERNATE APPROVAL)

Wall hydrant which is freeze resistant, self-draining and has integral backflow protection. This wall hydrant may serve wading pools, therapeutic pools, outside hose bibs, etc. **Max. 10 ft.** of head pressure.

ASSE 1020

Pressure Vacuum Breaker – Installed such that the bottom of critical level marked on the device is at least **12 inches above** the flood level rim of the

receptor and at the highest point downstream where backpressure may be created. Install outside only.

ASSE 1022

Double Check with Atmospheric vent. Serves carbonated beverage dispensers, juice dispensers, coffee machines and espresso and cappuccino machines (must be less than **15 lbs.** steam).

ASSE 1035

Vacuum Breaker – in line application. For high hazard cross connections NOT subject to continuous pressure. Allowed on laboratory sink faucets with serrated nipple or hose threads. Protects against backsiphonage only. Max. 6 ft. of head on no control valve downstream. Lab faucets only.

ASSE 1037

Pressurized flushing devices (flushometers) for plumbing fixtures. Approved flushometers have a built in vacuum breaker (ASSE 1001).

ASSE 1055A OR B

Vacuum Breaker serving chemical dispensing systems.

ASSE 1056

Spill Resistant Vacuum Breaker (SVB). Installed so that the bottom or Critical level marked on the device is at least **12 inches** above the flood level rim or above the highest point downstream where backpressure would be created. Designed for indoor use as a spill resistant device. Protects against backsiphonage only.

ANY SITUATION MAY BE SUBJECT TO ALTERNATE APPROVAL.

INSTALLATION OF TESTABLE ASSEMBLIES

1. The **minimum** distance between the floor and the lowest point of the assembly may not be less than **12 inches**.
2. The **maximum** distance between the floor and the lowest point of the assembly may not be more than **84 inches**.
3. The **minimum** distance between the ceiling or other obstruction and the highest point of the assembly may not be less than **18 inches**.
4. The **minimum** distance between a wall or other obstruction and the back and ends of the assembly may not be less than **4 inches**.
5. The **minimum** distance between a wall or other obstruction and the front of the assembly may not be less than **24 inches**.

TESTABLE DEVICES OR ASSEMBLIES

Device	Registration
ASSE 1020 Pressure Vacuum Breaker	Register
ASSE 1056 Spill-Resistant Vacuum Breaker	Register
ASSE 1013 Reduced Pressure Backflow Preventer	Register
ASSE 1047 Reduced Pressure Detector Backflow Preventer-FP Registered	Not
ASSE 1015 Double Check Backflow Preventer-FP Registered Post 94	Not
ASSE 1048 Double Check Detector Backflow Preventer-FP Post 1994	Not Registered

Table 382.41-1

Acceptable Cross Connection Control Methods, Devices or Assemblies

Methods or Assemblies of Cross Connection Control (Standard)	Situations and Conditions							
	Backpressure				Backsiphonage			
	Low Hazard		High Hazard		Low Hazard		High Hazard	
	Continu- ous	Noncon- tinuous	Continu- ous	Noncon- tinuous	Contin- uous	Noncon- tinuous	Contin- uous	Noncon- tinuous
	Pressure		Pressure		Pressure		Pressure	
Air-gap Fittings for use with Plumbing Fixtures, Appliances, and Appurtenances (ASME A112.1.3)					X	X	X	X
Air Gaps (ASME A112.1.2)	X	X	X	X	X	X	X	X
Atmospheric Vacuum Breaker (CAN/CSA B64.1.1)						X		X
Backflow Preventers with Intermediate Atmospheric Vent (ASSE 1012)	X	X			X	X		
Barometric Loops					X	X	X	X
Dual Check Valve Type with Atmospheric Port Backflow Preventer (CAN/CSA B64.3)	X	X			X	X		
Hose Connection Backflow Preventers (ASSE 1052)	X ^a	X	X ^a	X	X ^a	X	X ^a	X
Hose Connection Vacuum Breakers (CAN/CSA B64.2 and B64.2.2)	X ^a	X	X ^a	X	X ^a	X	X ^a	X
Hose Connection Vacuum Breakers (ASSE 1011)	X ^a	X	X ^a	X	X ^a	X	X ^a	X
Pipe Applied Atmospheric Type Vacuum Breakers (ASSE 1001)						X		X
Pressure Vacuum Breaker Assembly (ASSE 1020)					X	X	X	X
Reduced Pressure Principle Backflow Preventers And Reduced Pressure Fire Protection Principle Backflow Preventers (ASSE 1013)	X	X	X	X	X	X	X	X
Reduced Pressure Principle Backflow Preventer (CAN/CSA B64.4)	X	X	X	X	X	X	X	X
Spill Resistant Vacuum Breaker (ASSE 1056 and CAN/CSA B64.1.3)					X	X	X	X
Vacuum Breaker (CAN/CSA B64.1.2)					X	X	X	X

^a See limitation listed under s. SPS 382.41 (4) (c) 1. a.

Table 382.41-2

Acceptable Cross Connection Control Methods, Devices or Assemblies for Specific Applications

Methods or Assemblies (Standard)	Types of Application or Use
Backflow Preventer for Beverage Dispensing Machines (ASSE 1022)	Beverage dispensers
Chemical Dispensing Systems (ASSE 1055)	Chemical dispensing systems
Double Check Backflow Prevention Assemblies and Double Check Fire Protection Backflow Prevention Assemblies (ASSE 1015)	Automatic fire sprinkler systems and standpipe systems Water-based fire protection system
Double Check Detector Fire Protection Backflow Prevention Assemblies (ASSE 1048)	Automatic fire sprinkler systems and standpipe systems Water-based fire protection system
Double Check Detector Valve Type Backflow Preventer (CAN/CSA B64.5)	Automatic fire sprinkler systems and standpipe systems Water-based fire protection system
Dual Check Backflow Preventer Wall Hydrant — Freeze Resistant Type (ASSE 1053)	Hose threaded outlet connection
Hand Held Showers (ASSE 1014)	Hand held shower assemblies
Laboratory Faucet Type Vacuum Breakers (CAN/CSA B64.7)	Laboratory faucets
Laboratory Faucet Vacuum Breakers (ASSE 1035)	Laboratory faucets
Pressurized Flushing Devices (Flushometers) For Plumbing Fixtures (ASSE 1037)	Flushometer plumbing fixtures
Reduced Pressure Detector Fire Prevention Backflow Prevention Assemblies (ASSE 1047)	Automatic fire sprinkler systems
Trap Seal Primer Valves, Water Supply Fed (ASSE 1018)	Traps for drain systems
Vacuum Breaker Tees [s. SPS 382.41 (5) (j)]	Water treatment devices
Wall Hydrants, Frost Proof Automatic Draining Anti-Backflow Type (ASSE 1019), types A or B	Hose threaded outlet connections
Water Closet Flush Tank Ball Cocks (ASSE 1002)	Gravity water closet flush tanks

(4) LIMITATIONS. (a) Cross connection control devices shall be limited in use in accordance with the respective standard, unless otherwise specifically permitted under this subsection.

(b) 1. Except for a deck-mounted device, a pipe applied atmospheric vacuum breaker shall be installed such that the bottom of the device or the critical level mark on the device is at least 6" above all of the following:

a. The flood level rim of the receptor serving the water supply port.

b. The highest point downstream from the device where backpressure would be created.

c. The highest point of an injection or aspiration port.

2. A deck-mounted pipe applied atmospheric type vacuum breaker shall be installed such that the bottom of the device or the critical level mark on the device is at least one inch above all of the following:

a. The flood level rim of the receptor serving the water supply port.

b. The highest point downstream from the device where backpressure would be created.

c. The highest point of an injection or aspiration port.

(c) 1. a. The use of a hose connection backflow preventer, dual check backflow preventer wall hydrant-freeze resistant or a hose connection vacuum breaker in a continuous pressure situation shall be limited to campgrounds and marinas.

b. The use of a hose connection backflow preventer and a hose connection vacuum breaker shall be limited to the discharge side of a control valve such as a faucet or hose bibb.

2. A hose connection backflow preventer and a hose connection vacuum breaker may not be employed in backpressure situations of more than 10 feet of water column.

(d) A backflow preventer with intermediate atmospheric vent:

1. May not be employed in backpressure situations of more than 150 psig; and

2. May not serve boilers having a maximum steam pressure setting greater than 15 psig or a maximum water pressure setting greater than 30 psig.

(e) 1. A reduced pressure principle backflow preventer and a reduced pressure detector backflow preventer may not be subjected to a backpressure greater than twice the rated working pressure of the device.

2. A reduced pressure principle backflow preventer and a reduced pressure detector backflow preventer which serve a water-based fire protection system may have a test outlet located between the number 2 check valve and the number 2 listed indicating control valve.

3. A reduced pressure principle backflow preventer and a reduced pressure detector backflow preventer which are 2" or smaller in size and which serve a water-based fire protection system are not required to have a test cock on the number one listed indicating control valve.

(f) A hand-held shower may not be employed in backpressure situations of more than 5 feet of water column.

(g) 1. A double check backflow prevention assembly and a double check detector assembly backflow preventer may not be subjected to a backpressure greater than twice the rated working pressure of the device.

Backflow Protection - List of
DEPARTMENT OF COMMERCE

Unofficial Text (See Printed Volume). Current through date and Register shown on Title Page.

A-82.41 (3) CROSS CONNECTION CONTROL HISTORY.

CROSS CONNECTION CONTROL HISTORY TABLE

Application	Date	Code or Interpretation
Atmospheric vacuum breaker installation	1954	4 inch elevation above flood level of fixtures
	1979	6 inch elevation above flood level of fixtures
Shampoo Sinks	1977	ASSE 1001 6 inches above the flood level rim ASSE 1013 or ASSE 1012 serving several sinks
	3/1/94	Individual CCC required for each sink ASSE 1001 6 inches above highest point of use (19 inches) ASSE 1013 or ASSE 1056 12 inches above highest use ASSE 1014 approved faucet
Boilers	1977	ASSE 1012 for low pressures: 15 psig steam 30 psig water
	February 1986	ASSE 1012 for boilers: Pressure \leq 160 psig Rated working temperature \leq 250 degrees Actual temperature \leq 160 Pressure relief valve set at 30 psig max. Non-toxic additives Must not be in a hospital (hospital boilers require ASSE 1013)
	3/1/94	ASSE 1012 for low pressure (same) and non-toxic in mixed condition ASSE 1013 for high pressure or toxic
	12/1/04	Chemical pot feeder creates high hazard situation automatically
Laundry trays	1977	Residential – no CCC required on hose threads Commercial – ASSE 1001 required at 7'6"
	1987	Residential without hose threads – no additional device required Residential with hose threads – ASSE 1011 Commercial – ASSE 1001 @ 7'6" or ASSE 1011
	3/1/94	Residential without hose threads – no additional device required Residential with hose threads – ASSE 1011, ASSE 1001 @ 7'6" or ASSE 1052 Commercial – used for building maintenance with or without hose threads, same as residential with hose threads
Hose bibb for maintenance	1987	ASSE 1011 or ASSE 1001 @ 7'6"
	3/1/94	ASSE 1011 or ASSE 1019
Hose reels	1977	ASSE 1001 with stipulations or ASSE 1013
	3/1/94	ASSE 1020 (exterior only) with stipulations ASSE 1056 with stipulations or ASSE 1013
Sink overhead	1987	ASSE 1012 or Spring making cross connection impossible
Heat exchangers	1986	Double wall draining to atmosphere with toxic heat transfer fluids Single wall when non-toxic heat transfer fluids
Yard hydrants	July 1987	Sanitary hydrant with ASSE 1011 or ASSE 1012 serving only that hydrant and label hydrant as "non-potable" and hose threads protected with ASSE 1011
	9/1/01	Must be sanitary hydrant without below ground bleed
ASSE 1012	3/1/94	Limited to low degree of hazard

LABELING AND TAGGING

SPS 382.40(3) (c) Protection. 1. Pursuant to s. NR 811.09 (2) the inter - connection of 2 or more water supply systems, one system served by a public supply source and the other system served by another supply source is prohibited, unless approved in writing by the Department of Natural Resources.

SPS 382.40(3) (d) Identification. 1. Where buildings or facilities contain water supply systems where the water supply systems have different degrees of hazard, all water supply systems shall be labeled in accordance with section **Comm 82.40**. This provision was effective 1994.

SPS 382.40(3) (d) Identification. 3. The installation of each reduced pressure principle backflow preventer, reduced pressure detector backflow preventer, pressure vacuum breaker assembly, and back siphonage backflow vacuum breaker shall display a department assigned identification number. This provision was effective September 1, 2001.

SPS 382.41(3) (b) Classifications. 6 a. A high hazard situation shall be considered to exist for a connection of 2 water supply systems one supplied by a public water supply and the other system supplied by a private well.
Note: The interconnection of a public water supply system and another source of water is addressed in s. NR 811.09 and must be approved by the Department of Natural Resources.

SPS 381.01(280) “Water distribution systems” means that portion of a water supply system from the building control valve to the connection of a fixture supply connector, plumbing fixture, plumbing appliance, water-using equipment or other piping systems to be served.

SPS 381.01(284) “Water supply system” means the piping of a private water main, water service and water distribution system, fixture supply connectors, fittings, valves, and appurtenances through which water is conveyed to points of usage such as plumbing fixtures, plumbing appliances, water-using equipment or other piping systems to be served.

SPS 381.01(176) Process Piping: Process piping is a system that conveys process water. Process water is potable water that has been altered or modified by the addition of a product, chemical or ingredient, such that it has been degraded to where it would cause a nuisance, be aesthetically objectionable, or could cause minor damage. Drinking the water would not constitute a health hazard. For example, water is potable to the point where the first ingredient is added to the water for brewing beer. From that point on, the system is process piping

AUTHORITY:

In case of ***imminent health hazard*** the Plumbing Inspector has unrestricted authority to require tagging and labeling.

SUMMARY:

Potable water system only – **labeling** not required

Two (2) system piping – **labeling** required on both systems

EX: Municipal water and well, river water or other source.

Potable water and process piping systems – **labeling** both systems required

Potable water w/branches to protective devices – **label** protected piping required

NOTE:

Labeling not required to be done under permit or by licensed personnel.

TESTABLE ASSEMBLIES SHALL INCLUDE:

1. Regulated object number
2. Potable tag
3. Non potable tag

VALVE TAGS

1. Non potable – 4 inch equilateral triangle - yellow
2. Potable -3 inch circle - green

IDENTIFICATION

Where buildings or facilities contain water supply systems with different degrees of hazard, all water supply systems shall be labeled. Systems with only potable water do not require labeling. If safe and unsafe piping for a testable assembly is contained to one room i.e. Boiler Room. Tagging and Labeling may be limited to that room. If unsafe piping exits that room, labeling and tagging shall continue to end point of use.

Identify all safe water piping with green bands, minimum 3 inches wide, and all unsafe piping with yellow bands, minimum 3 inches wide, every 25 feet maximum and at each side where the piping passes through a wall, floor or roof. Any other method shall have the approval of the bureau of integrated services in writing. (Permit is not required)

Order labeling and tagging when conducting a cross connection survey
discuss with supervisor for time requirements

Subchapter IV — Water Supply Systems

SPS 382.40 Water supply systems. (1) **SCOPE.** The provisions of this section set forth the requirements for the design and installation of water supply systems.

Note: Chapter **NR 811** governs the design and construction of community water systems or waterworks.

(2) **MATERIALS.** All water supply systems shall be constructed of approved materials in accordance with ch. **SPS 384**.

(3) **GENERAL.** (a) **Water quality.** 1. Every outlet providing water shall be provided with water of the quality as specified under s. **SPS 382.70** (3) for the intended use.

2. Nonpotable water may be supplied to water treatment devices or systems designed to treat water for compliance with Table 382.70-1.

(b) **Hot water required.** Except as provided in subds. 1. and 2., hot water shall be provided to all plumbing fixtures, appliances and equipment used for personal washing, culinary purposes or laundering.

1. Tempered water. a. Tempered water or hot water shall be provided to lavatories, wash fountains and shower heads which are not located in dwelling units or living units.

b. Tempered water supplied to serve multiple lavatories, wash fountains and shower heads shall be provided by means of temperature-actuated mixing valves that comply with ASSE 1017.

2. Lavatories located in park shelters and bath houses which are not open during the period from November 15 to March 15 and which are not places of employment shall not be required to be provided with hot water.

3. Lavatories located in waysides which are not places of employment shall not be required to be provided with hot water.

Note: The exception of providing hot water under subds. 1. to 3. does not supersede the requirements of other state agencies for providing hot water.

(c) **Protection.** 1. Pursuant to s. **NR 811.07** the interconnection of 2 or more water supply systems, one system served by a public supply source and the other system served by another supply source is prohibited, unless approved in writing by the department of natural resources.

2. A water supply system shall be designed and installed in accordance with s. **SPS 382.41** and maintained to prevent non-potable liquids, solids or gases from being introduced into the potable water supply system through cross connections.

3. a. Except as provided in subd. 3. b., when a connection between 2 water supply systems exists, one system having a higher degree of hazard than the other system as specified in s. **SPS 382.41**, the water supply system with a lower degree of hazard shall be protected as specified in s. **SPS 382.41**.

b. When a water treatment device is provided to lower the concentration of a health-related contaminant, cross connection control shall not be required to protect the water supply system downstream of the treatment device from the upstream contaminated source.

(d) **Identification.** 1. Where buildings or facilities contain water supply systems where the water supply systems have different degrees of hazard, then those water supply systems shall be labeled in accordance with this section.

a. Aboveground piping supplying water other than potable shall be labeled by tags or colored bands according to Table 382.40-1a.

Note: When identifying potable water piping or valves with tags or bands, label according to Table 382.40-1a.

b. Valves supplying other than potable water shall be identified by tags according to Table 382.40-1a.

c. The tags or colored bands shall be placed at intervals of not more than 25 feet. Where piping passes through a wall, floor or roof, the piping shall be so identified on each side of the wall and within each compartment.

d. The colored bands shall be at least 3 inches wide and shall bear text identifying the water or the specific use.

e. Tags used to identify water outlets, valves and piping shall be of metal or plastic in the shape specified in Table 382.40-1a.

f. The lettering on the triangular and circular tags shall be at least 1/2 inch in height.

g. A hose bibb intended to discharge water that does not meet drinking water quality as specified in s. **SPS 382.70**, shall be labeled as nonpotable or so identified for the specific use or uses, and shall be equipped with a removable handle.

2. Piping downstream of cross connection control assemblies as listed in Table 382.22-1 shall be labeled with bands or tags as specified in subd. 1. a. to f.

3. Where a building or a structure is served by 2 distribution systems, one system supplied by a public water supply and the other system supplied by a private well, each water distribution system shall be identified to indicate the supply source.

4. The installation of each reduced pressure principle back-flow preventer, reduced pressure fire protection principle back-flow preventer, reduced pressure detector fire protection back-flow preventer, spill resistant vacuum breaker and pressure vacuum breaker shall display a department assigned identification number.

a. The method to display the department assigned identification number shall be a weather-resistant tag, securely attached to the cross connection control assembly.

b. The tag shall contain at least the following information.

<p>Wisconsin Department of Safety and Professional Services</p> <p>Identification/Object Number _____</p> <p>Cross Connection Control Assembly</p> <p>Do Not Remove This Tag</p>
--

c. The department assigned identification number shall be printed in the blank area with a permanent, waterproof marker or similar indelible method.

Note: To obtain a Department-assigned identification number for a cross connection control assembly, contact the Department's Division of Industry Services at P.O. Box 7162, Madison, WI 53707-7162; or at telephone (608) 266-2112 or (877) 617-1565 or 711 (Telecommunications Relay); or at fax (608) 267-9723; or at the Division's Web site at <http://dps.wi.gov/programs/industry-services>.

(c) **Multipurpose piping system.** 1. Except as provided in subd. 2., a multipurpose piping system shall be designed and installed in accordance with this section and NFPA 13D.

Note: Pursuant to this subdivision and sub. (2), materials for multipurpose piping systems need to be acceptable under the NFPA 13D standard and s. **SPS 384.30**, Table 384.30-9.

Note: See s. **SPS 321.095** of the Dwelling Code and s. **SPS 362.0903** (10) of the Commercial Building Code as to fire protection provisions for multipurpose piping systems.

2. Fire department connections are prohibited in a multipurpose piping system.

(4) **CONTROL VALVES.** (a) **Private water mains.** Private water mains shall be provided with control valves as specified in this subsection.

1. 'Corporation cocks.' a. If a private water main 2" or less in diameter connects to a public water main, a corporation cock shall be installed at the connection to the public water main.

b. If a private water main 2-1/2" or larger in diameter connects to a public water main, a corporation cock shall be installed not more than 8 feet from the connection to the public water main.

2. 'Curb stops.' a. Except as provided in subd. 2. b., if a private water main connects to public water main, a curb stop shall be installed in the private water main between the corporation cock and the property line.

b. If a private water main 2-1/2" or larger in diameter connects to a public water main, one control valve may serve as the corporation cock and the curb stop. The control valve shall be

CONTACTS FOR CROSS CONNECTION

CITY OF MILWAUKEE:

Chris Krowski	414-286-8221	Supervisor
Loren Austin	414-286-8287	Inspector
Tom Jesmok	414-286-8291	Inspector
James Kosmatka	414-286-3356	Inspector
JoVaughn McFarland	414-286-8288	Inspector
Earnest Mitchell Jr	414-286-8290	Inspector
Paul Savoie	414-286-8257	Inspector
Dave Thiessenhusen	414-286-3364	Inspector
Chellei Harris	414-286-5157	Inspector
Adam Karns	414-286-8237	Inspector
Dave Mattox	414-286-8262	Inspector

AUTOCLAVES / STERILIZERS

SPS 382.41-Cross-connection control for **Autoclaves** is based upon their degree of hazard for the protection of the potable water supply. All water lines to an autoclave are required to be protected against backflow with an approved method or a Wisconsin approved backflow device or assembly. The water supply is designated as a **high** hazard if any of the following applies:

TYPES:

1. Discharges into a chamber
2. Over 15 pounds Steam pressure
3. Over 30 pounds Water pressure
4. Used for pathogens
5. Steam that contains toxic chemicals.

NOTES:

Autoclaves shall discharge through indirect waste to an air gap.

Occasionally an autoclave or sterilizer may be designated as **low hazard**.

APPROVED METHOD OF BACKFLOW PROTECTION

- | | |
|--------------|---|
| 1. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 2. ASSE 1012 | Dual check with atmospheric vent |
| 3. ASSE 1013 | Reduced pressure backflow preventer |
| 4. ASSE 1056 | Spill resistant vacuum breaker |

AUTOMATIC CLOTHES DRYER

SPS 382.41 - Cross-connection control for **Automatic Clothes Dryer with Steam** is based on a low degree of hazard for the protection of the potable water supply.

TYPES

Residential

BACKFLOW PROTECTION

An automatic clothes dryer with a water supply shall be protected to prevent contaminants from entering the potable water supply.

NOTE:

If chemicals are introduced into the process, the degree of hazard becomes high.

APPROVED METHOD OF BACKFLOW PROTECTION

- | | |
|--------------|-------------------------------------|
| 1. ASSE 1012 | Dual check with atmospheric vent |
| 2. ASSE 1013 | Reduced pressure backflow preventer |
| 3. ASSE 1056 | Spill resistant vacuum breaker |

BATTERY FILL STATION

SPS 382.41 – Cross Connection Control for a batter fill station is based upon a high degree of hazard for the protection of the potable water supply.

TYPES

There are several different types of battery fill stations but commonly a hose is used. If a spray nozzle is on the hose it needs to be determined if it is a positive shut off. Any other types must be looked at closely and backflow protection must be considered on a case by case basis.

BACKFLOW PROTECTION

The water supply serving the **battery fill station** must be protected to the highest degree to prevent battery acid and other toxins from entering the potable system.

APPROVED METHODS OF BACKFLOW PROTECTION

- | | |
|--------------|---|
| 1. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 2. ASSE 1011 | Hose connection vacuum breaker |
| 3. ASSE 1013 | Reduced zone backflow preventer |
| 4. ASSE 1052 | Hose connection backflow preventer |
| 5. ASSE 1056 | Spill Resistant vacuum breaker |

BEVERAGE DISPENSERS

SPS 382.41 – Cross-connection control for **beverage dispensers** is based on low and high degrees of hazard for the protection of the potable water supply.

TYPES

The most common types of **beverage dispensers**, with water connections, are carbonated beverages, juice dispensers, coffee/cappuccino/espresso machines and hot chocolate dispensers. **Beverage dispensers** not connected to the water supply are not a concern of cross-connection. This would include carbonated beverages dispensed from charged tanks and any **beverage dispenser** that is hand filled.

BACKFLOW PROTECTION

The water supply serving **beverage dispensers** must be protected to the degree of hazard to prevent CO₂ (carbonated gases) from entering the water supply. The use of copper or brass is prohibited downstream of the backflow protection device. The highest degree of protection used on cappuccino and espresso with actual boilers that **exceed** 15 pounds (1 bar) of steam or 30 pounds of water. This protection is to prevent any contents of boiler from over powering the water supply line and entering the water supply system. The low hazard classification is used on all other **beverage dispensers** to prevent any contaminants from entering the water supply system.

APPROVED METHODS OF BACKFLOW PROTECTION

1. ASSE 1012 Dual check with atmospheric vent (Lead Free)
2. ASSE 1013 Reduced principal backflow preventer assembly
3. ASSE 1022 Dual Check w/atmospheric vent

BEVERAGE DISPENSER W/WATER BATH

COOLING

SPS 382.41 – Cross-connection control for **water bath beverage dispenser** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

There are basically two types of **water bath beverage dispenser**, air-cooled (more common now) and water-cooled (which is what we are focusing on in this chapter). The water bath cooling type does exactly what it says: It cools the carbonator by surrounding it with water. These units are generally in big cases, which make it difficult to identify and track water lines.

BACKFLOW PROTECTION

The water supply serving the **water bath beverage dispenser** must be protected to prevent CO2 gas, copper sulfate and water (from bath reservoir) from entering the water supply system. A **high hazard** backflow preventer is required on the feed to the water bath.

NOTE:

No copper or brass between BFP and carbonator is allowed.
Bath water is typically a manual feed (if water is low, fill it). Some units do have a fill valve tied into water supply pipe. It must have back flow protection. Approved fill valves (toilet type & others) can be used as long as they do not become submerged.

APPROVED METHOD OF BACKFLOW PROTECTION

- | | |
|-----------------|---|
| 1. ASME 112.1.2 | Air Gap (on bath fill pipe) |
| 2. ASSE 1001 | Pipe applied vacuum breaker |
| 3. ASSE 1013 | Reduced pressure principle backflow preventer |
| 4. ASSE 1022 | Dual check valve w/atmospheric vent |

CARBONATOR-OPEN

MUST MEET
ASSE 1022
STANDARDS

CITY WATER
UP TO BFP

CO2 IN

CARBONATOR
TANK

NOTE "A"

CO2 WATER
OUT

FIXTURE STOP
VALVE

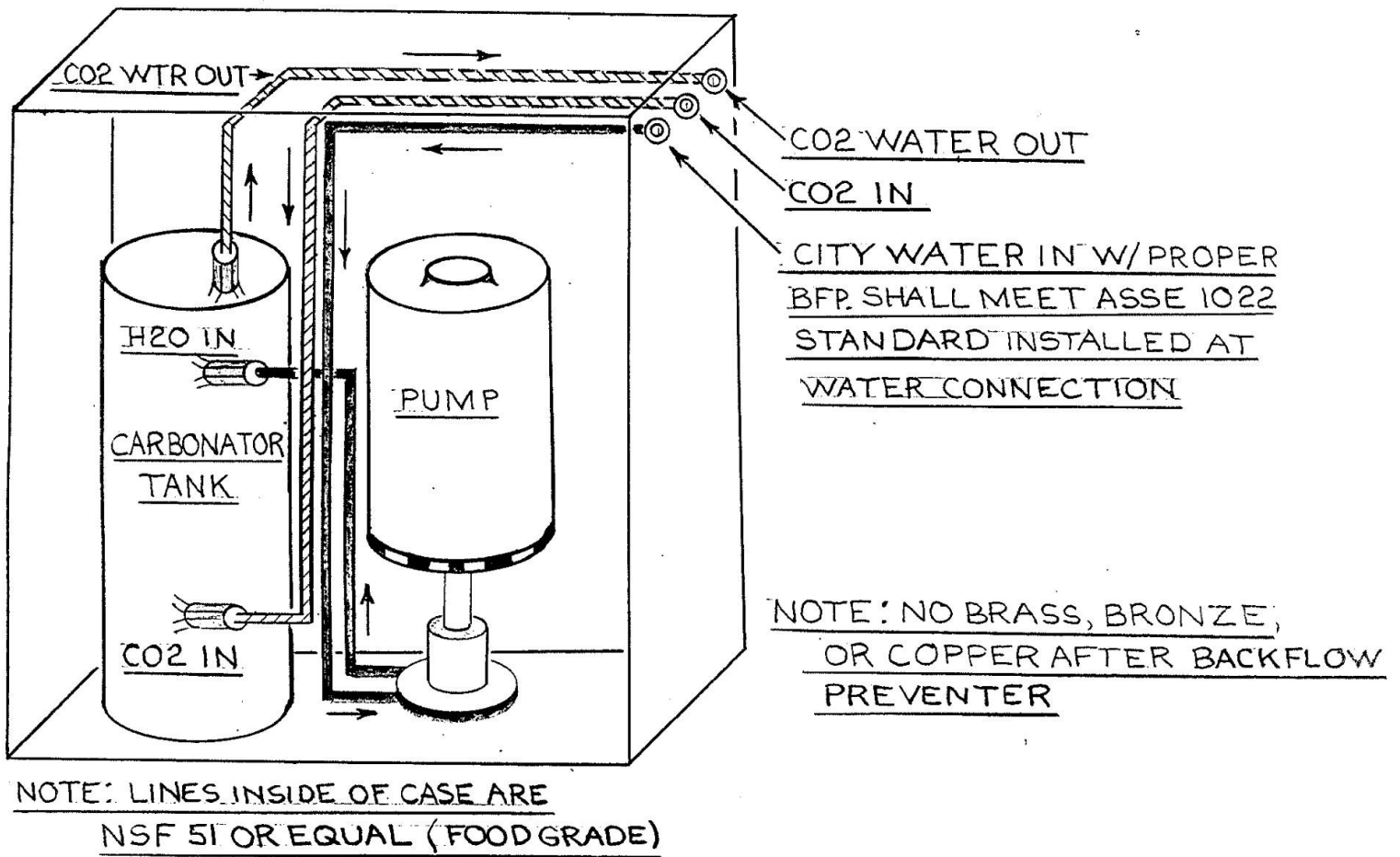
$\frac{1}{2}$ " C.W.

PUMP

NOTE "A"

IF BFP IS INSTALLED ON
THE PUMP (OUTLET SIDE)?
NO BRASS, BRONZE OR COPPER
TUBING MAY BE INSTALLED
DOWNSTREAM OF BFP

CARBONATOR (UNIT IN CASE)



BOILERS

SPS 382.41 (3) (b) 4. d. A high hazard cross connection situation shall be considered to exist at a chemical pot-feeder or automatic chemical feeder installed to serve a boiler, cooling tower or chilled water system. Boiler blow down tanks should be checked for any interconnection of the potable water system.

*Discharges require **AIR GAP**.

BACKFLOW PROTECTION

Heat exchangers can be classified into two categories, domestic non-toxic (single wall) and double wall units. Double wall units have a visible vent port for leak detection. The only way to protect the potable water supply serving a **heat exchanger** is with a double wall **heat exchanger**. Single wall **heat exchangers** should only be used when both heat source and heated water are domestic use. Double wall **heat exchangers** are required in all other situations involving domestic hot water.

382.41(3) (d) Prohibitions. The use of a toxic solution as a heat transfer fluid in a single-wall heat exchanger for potable water is prohibited.

EXAMPLE

1. A boiler with a side arm heat exchanger for domestic use. Boiler must be protected per specifications in boiler chapter and heat exchanger must be double wall.

NOTE:

A leak (hole) on double wall heat exchangers signifies a problem and requires immediate attention. This condition is similar to a valve leaking, which also requires immediate attention.

EXAMPLE

2. Domestic single wall heat exchanger. The use of a high temperature water heater for kitchen use with heat exchanger to lower temperature for domestic sink use. Or, reverse and use heat exchanger to raise temperature for kitchen use. No backflow protection required on heater and heat exchanger can be single wall. (Both heater and heat exchanger are for domestic use)

APPROVED METHOD OF BACKFLOW PROTECTION

LOW HAZARD

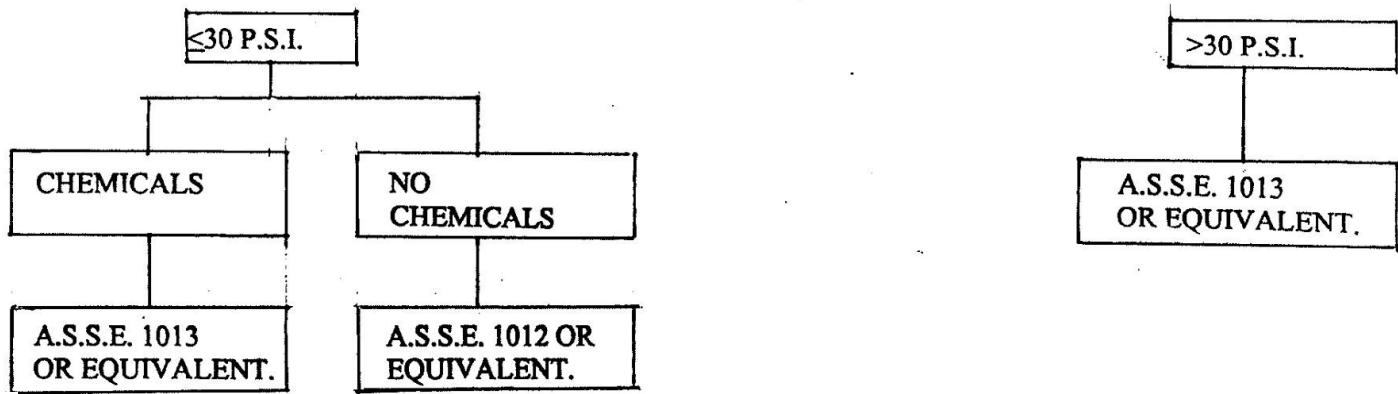
1. ASSE 1012 Dual check with atmospheric vent

HIGH HAZARD

1. ASME A112.1.2 Air gap on potable water line
2. ASSE 1013 Reduced pressure backflow preventer

BOILER TYPE

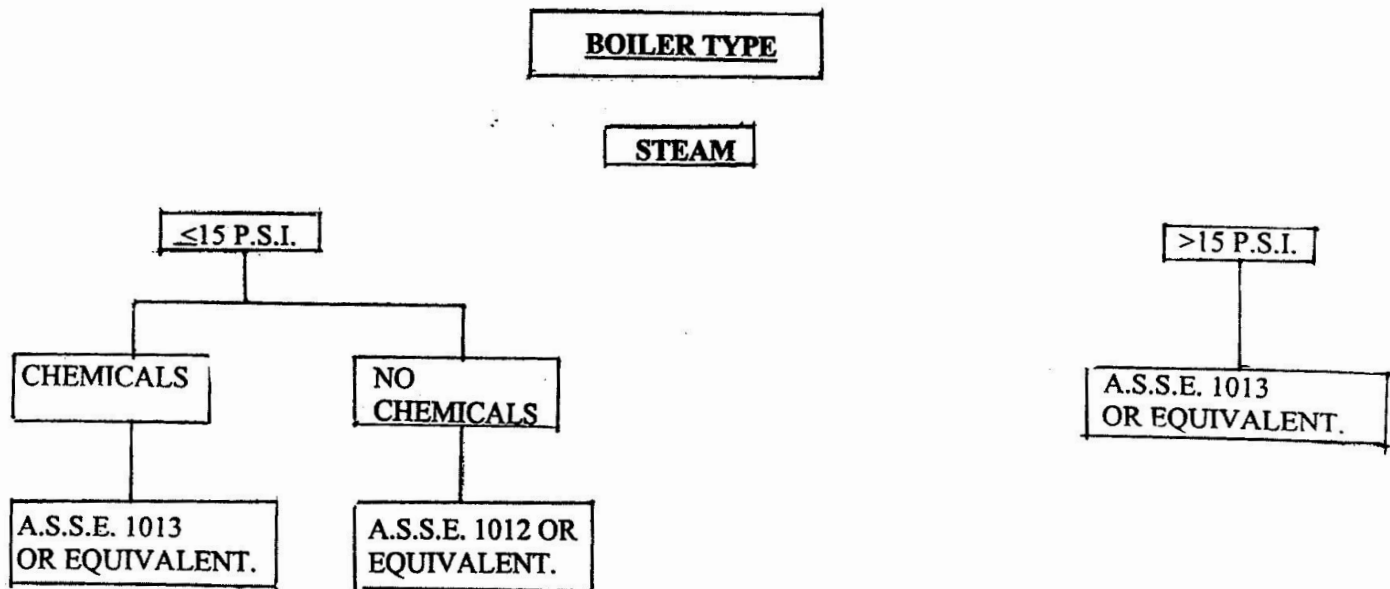
WATER



Does the system have a potable water supply used as make up water for any equipment?

Does the system have any unprotected fast fill open by-pass or storage tanks?

Does the system have a booster pump (approved back flow device goes in front –upstream of booster pump).

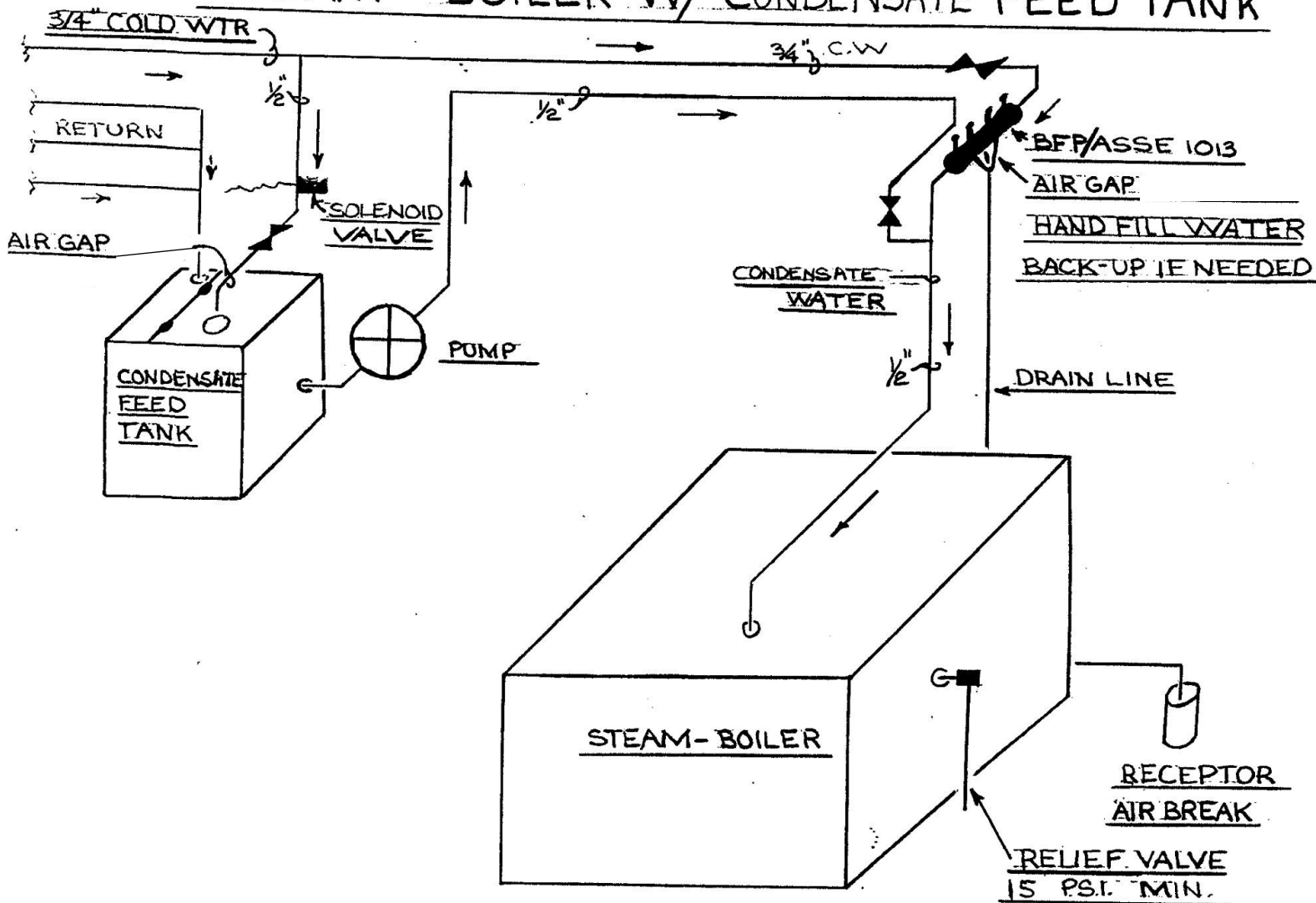


Does the system have a potable water supply used as make up water for any equipment?

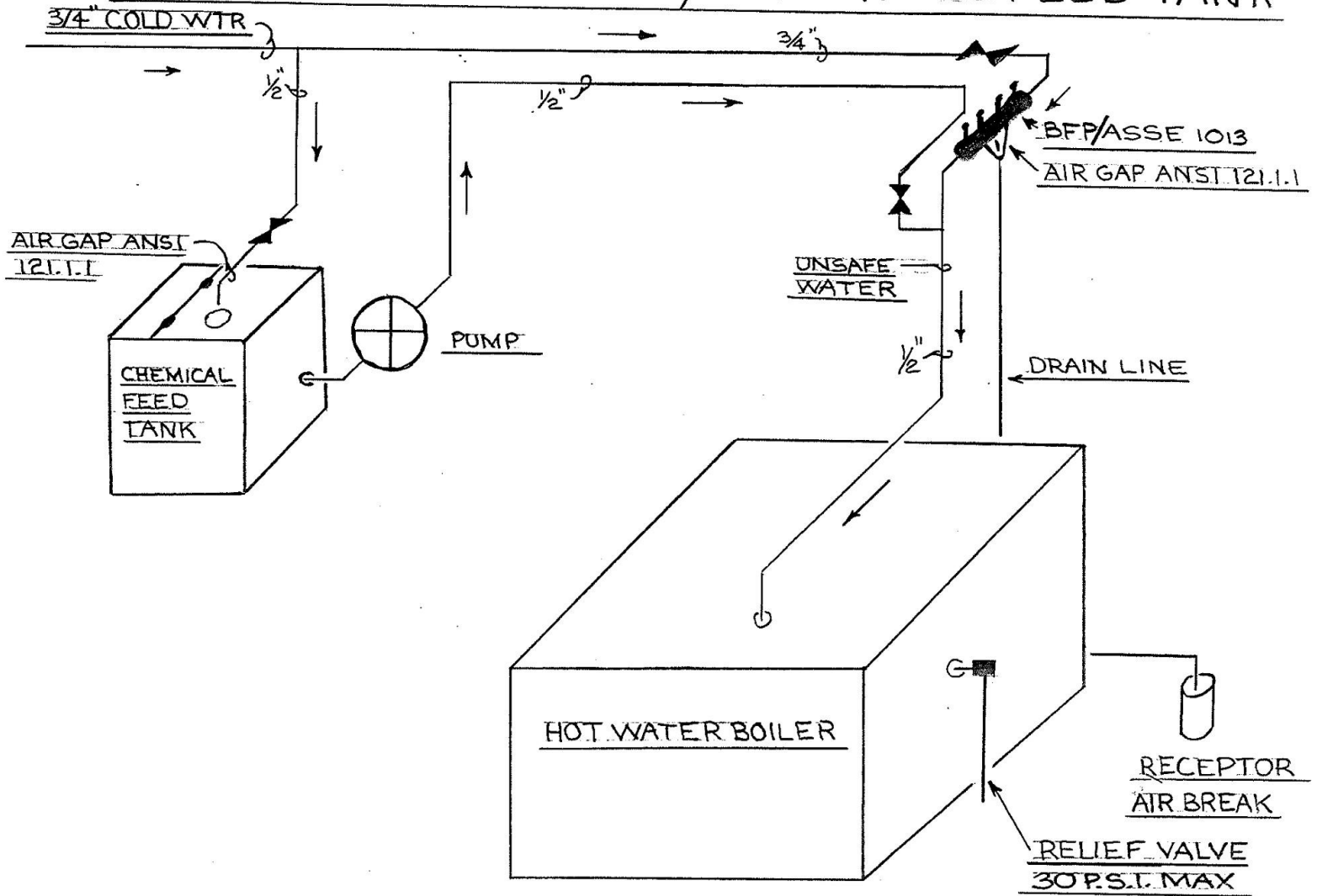
Does the system have any unprotected fast fill open by-pass or storage tanks?

Does the system have a booster pump (approved back flow device goes in front –upstream of booster pump).

STEAM - BOILER W/ CONDENSATE FEED TANK



HOT WATER BOILER W/ CHEMICAL FEED TANK



CAR WASH

SPS 382.41 - Cross-connection control for car washes is based on a **high** degree of hazard for the protection of the potable water supply.

NOTE:

One RP valve can serve all car wash equipment. Hot water must be protected and **only** serving car wash equipment.

APPROVED METHOD OF BACKFLOW PROTECTION

1. ASME A112.1.2 Air gap
2. ASSE 1013 Reduced pressure principle backflow preventer

CHILLERS & COOLING TOWER

SPS 382.41(3) (d) 4.d. - Cross-connection control for **chillers & cooling towers** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

Chillers & cooling towers are used for cooling buildings and equipment. Most applications are found in commercial and industrial facilities.

Air conditioning – cooled water is distributed to chillers, or coils, in air handling units. The used water is recirculated back to cooling tower.

Equipment cooling – industrial chillers are used for controlled cooling of products. Uses include: welding equipment, generation stations, analytical equipment as well as high heat items such as lasers, MRI machines and more.

Cooling towers – used to draw heat from the cooling water circulating through the condenser of a chiller. The cooled water is recycled back to the chiller. Often time's chemicals are added to the water. Some of these chemicals include glycol, corrosion inhibitors and others. When connected to domestic water it will require high degree of hazard protection.

Potable water is added to cooling towers to replenish water lost by evaporation. Water is introduced either by an air gap or by a submerged inlet on reservoir or by a direct pipe connection to cooling piping.

NOTE:

Follow make-up water line to make certain it is connected to the Potable water supply. Chillers and boilers shall not share a backflow preventer.

BACKFLOW PROTECTION

Backflow protection is required to protect potable water from chemicals and recycled water in system.

Attention must be made to where **(locate)** chemicals tie into system.

When potable water line ties into system-**exchangers must be double wall.**

APPROVED METHOD OF BACKFLOW PROTECTION

1. ASME A112.1.2 Air gap on make-up water line
2. ASSE 1001 Pipe applied atmospheric vacuum breaker.
3. ASSE 1013 Reduced pressure principle backflow preventer.
4. ASSE 1020 Pressure vacuum breaker – not spill proof
(Typical exterior applications)
5. ASSE 1056 Spill Resistant vacuum breaker

CLOTHES WASHER – COMMERCIAL

SPS 382.41- Cross-connection control for **commercial clothes washer** is based on a **high** degree of hazard for the protection of the potable water supply.

TYPES

The types of **clothes washers** usually include top load, front load & oversize load. **Clothes washers** have hoses hooking up to the back & run through a vacuum breaker or an air gap.

BACKFLOW PROTECTION

Soaps & detergents added to laundry are what make this situation a high hazard. All backflow protection must be in place (in line) before soap or detergent.

APPROVED METHOD OF BACKFLOW PROTECTION

1. ASME A112.1.2 Air gap where hoses hook-up to washer.
2. ASSE 1001 Pipe applied atmospheric vacuum breaker
3. ASSE 1013 Reduced pressure principle backflow protector
4. ASSE 1056 Spill Resistant vacuum breaker

COMPRESSOR - WATER COOLED

SPS 382.41-Cross-connection control for **water cooled compressors** is based on a **high** degree of hazard for the protection of the potable water supply.

TYPES

There are different ways to cool compressors; this will determine the type of backflow protection to be used. Cooling lines that run into compressor with a single wall jacket will require high hazard protection.

NOTE:

Pipes wrapped around the compressor and double wall cooling jackets are considered protected. These conditions require an **air gap** where cooling line discharges into receptor. No additional backflow protection is required in these situations.

BACK FLOW PROTECTION

The water supply serving the **water cooled compressor** must be protected at a **high** degree of hazard to prevent drain water or lubricant fluids from entering the water supply system.

APPROVED METHODS OF BACK FLOW PROTECTION

- | | |
|------------------|---|
| 1. ASME A112.1.2 | Air gap on discharge cooling line |
| 2. ASSE 1013 | Reduced pressure principle backflow preventer |
| 3. ASSE 1056 | Spill Resistant vacuum breaker |

COSMETOLOGY SINKS/PEDICURE CHAIRS

SPS 382.41 Cross-connection control for **cosmetology sinks** and pedicure chairs is based on their **high** degree of hazard for the protection of the potable water supply

TYPES

Integral backflow protection or backflow assemblies and/or devices shall be added

Each fixture needs its own backflow protection.

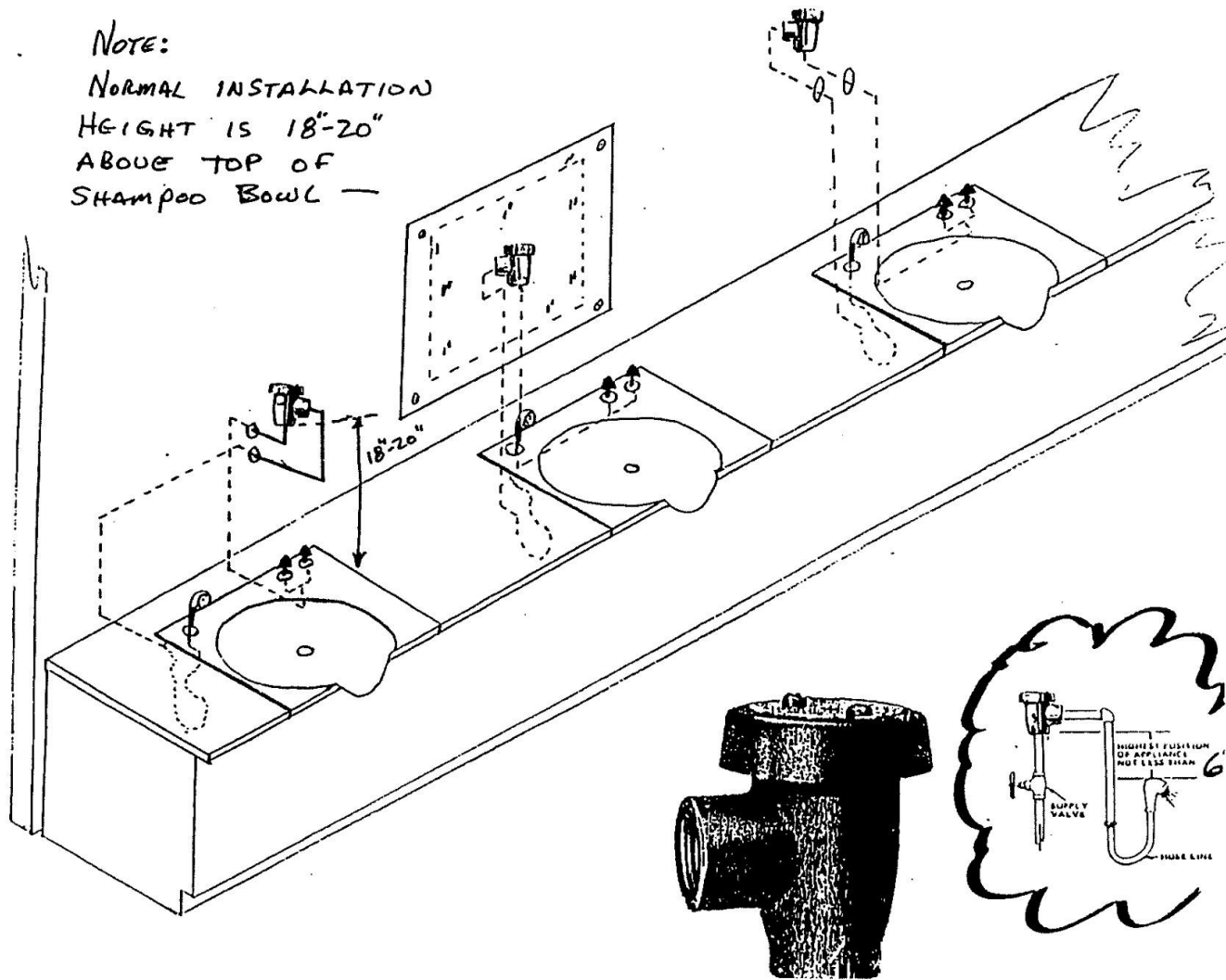
NOTE:

Drains on Pedicure chairs smaller than 1 ¼ inch with gravity discharge, or any size drain with pumped discharge must drain indirect to a receptor. Drains 1 ¼ inch or larger, that flow by gravity, shall be connected directly to the drain and vent system with a vented trap.

APPROVED METHODS OF BACKFLOW PROTECTION:

1. Fixed spout with an air gap and no pull-out spout.
2. ASSE 1001 Pipe applied atmospheric vacuum breaker, 6 inches above the length of pull-out spout
3. ASSE 1013 Reduced pressure principle back flow preventer
4. ASSE 1014 Deck Mount Spring Loaded Atmospheric Vacuum Breaker specific for hand held devices. May not be employed in back pressure situations of more than 5 ft. of water column.
5. ASSE 1056 Spill Resistant vacuum breaker
6. ASME A112.18.3 For the faucet, or the faucet must meet current ASME standards for backflow protection in the State of Wisconsin.

NOTE:
 NORMAL INSTALLATION
 HEIGHT IS 18"-20"
 ABOVE TOP OF
 SHAMPOO BOWL —



DEIONIZATION FILTER

SPS 382.41 – Cross-connection control for **deionization filter** is based on a low degree of hazard for the protection of the potable water supply.

TYPES

The type of protection will be based on the fixture being served by the **deionization filter**. That fixture or process could raise the hazard to a high degree.

BACKFLOW PROTECTION

The water supply serving the **deionization filter** must be protected to the degree necessary to protect water from the fixture being served after the **deionization filter**. **Deionization filters** remove minerals from the water and can have an effect on metallic piping. This is considered low hazard and will require proper backflow protection installed before **deionization filter**.

NOTE:

Metallic piping should not be used after deionization filter.

APPROVED METHOD OF BACKFLOW PROTECTION

- | | |
|--------------|---|
| 1. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 2. ASSE 1012 | Dual check with atmospheric vent |
| 3. ASSE 1013 | Reduced pressure principle backflow preventer |
| 4. ASSE 1056 | Spill Resistant vacuum breaker |

DENTAL CHAIRS

SPS 382.41-Cross-connection control for **dental chairs** is based on high degree of hazard for the protection of the potable water supply.

TYPES

There are (3) there types of chairs; back, side and cabinet. The back and side types refer to the position of the dentist in relation to the patient. Cabinet type conceals all of the equipment in a cabinet.

BACKFLOW PROTECTION

The equipment that generally needs backflow protection are the spray wand and cuspidor.

Note: The spray wand can be fed by a water system. The cuspidor can have an above the rim filler for rinse. In either case, additional BFP is not required.

APPROVED METHODS OF BACKFLOW PROTECTION

Each water line to each chair shall be protected.

- | | |
|--------------|--|
| 1. ASSE 1013 | Reduced pressure principle backflow preventer. |
| 2. ASSE 1056 | Spill Resistant vacuum breaker |

DENTAL MOLD GRINDER

SPS 382-41 – Cross-connection control for **dental mold grinders** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

There are two types of mold grinders. The first, has its water line coming into the top of the unit, the State considers this to be an approved air gap. The second, has its water line submerged and must be protected as such.

APPROVED METHOD OF BACKFLOW PROTECTION

1. ASME A112.1.2 Air Gap
2. ASSE 1001 Pipe applied atmospheric vacuum breaker
3. ASSE 1013 Reduced pressure backflow preventer
4. ASSE 1056 Spill resistant vacuum breaker

DENTAL VACUUM SYSTEMS

SPS 382.41(4) (e) 1-Cross-connection control for **dental vacuum systems** is based on high degree of hazard for the protection of the potable water supply.

TYPES

Types of vacuum systems include wet system and dry system. Sizes vary in compressor motors and tank sizes. Units may also include amalgam collectors (mercury separators) built on compressor unit.

Note: Amalgam collectors became state law in Feb. 2008.

Wet vacuum systems use water for cooling and flushing. National code requires atmospheric vacuum breaker built on unit. Wisconsin State Code requires reduced pressure principle backflow preventer.

APPROVED METHOD OF BACKFLOW PROTECTION

Each water line to each vacuum system must be protected.

1. ASSE 1001 Pipe applied atmospheric vacuum breaker.
2. ASSE 1013 Reduced pressure principle backflow preventer.
3. ASSE 1056 Spill Resistant vacuum breaker

DISHWASHER – COMMERCIAL

SPS 382.41 Cross connection control for **commercial dishwasher** is based on a high degree of hazard for the protection of the potable water supply.

TYPE:

Commercial type D.W. machines shall conform to ASSE 1004.

NOTE:

Discharge can be air gap or break.

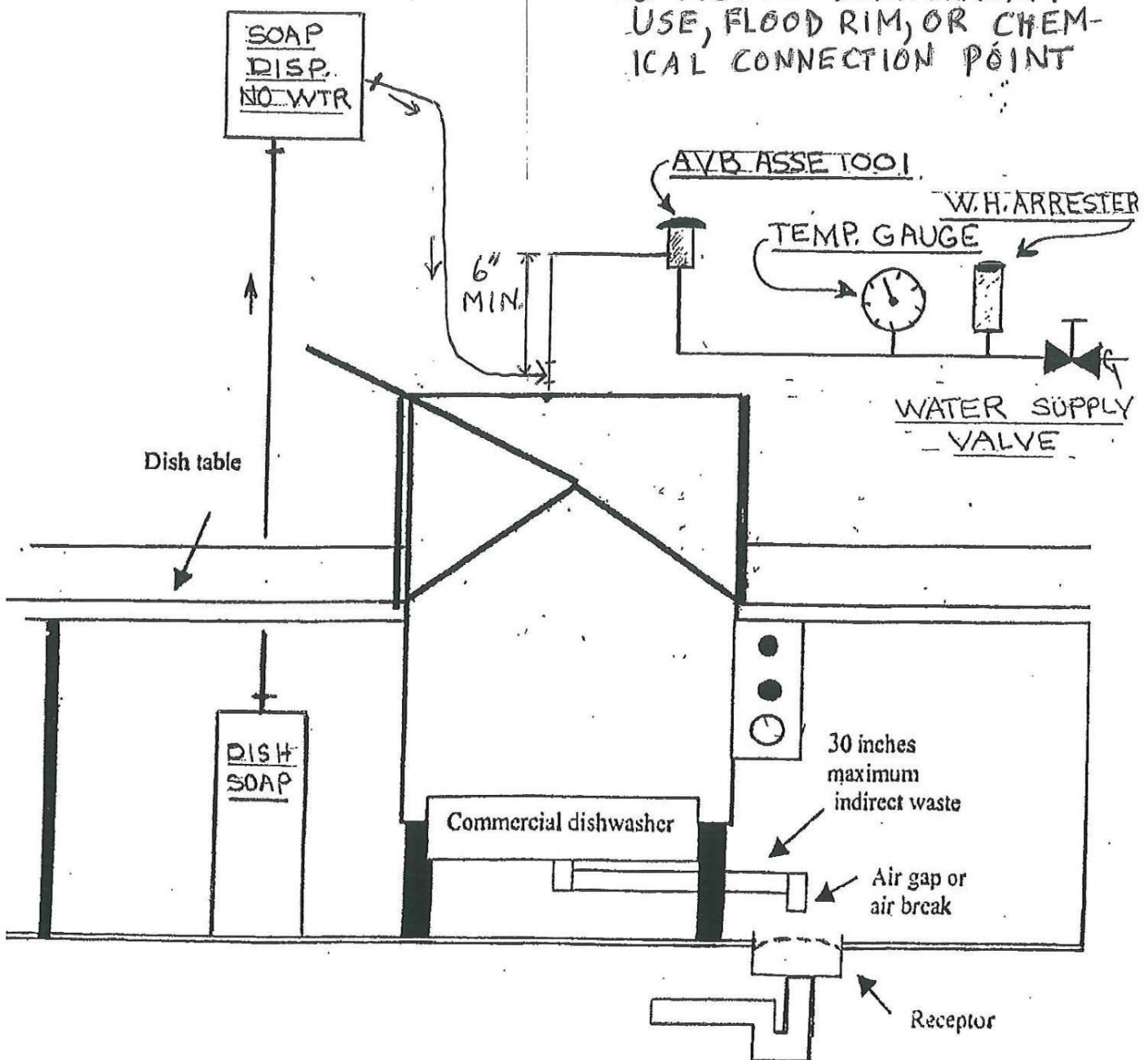
APPROVED METHOD OF BACKFLOW PROTECTION

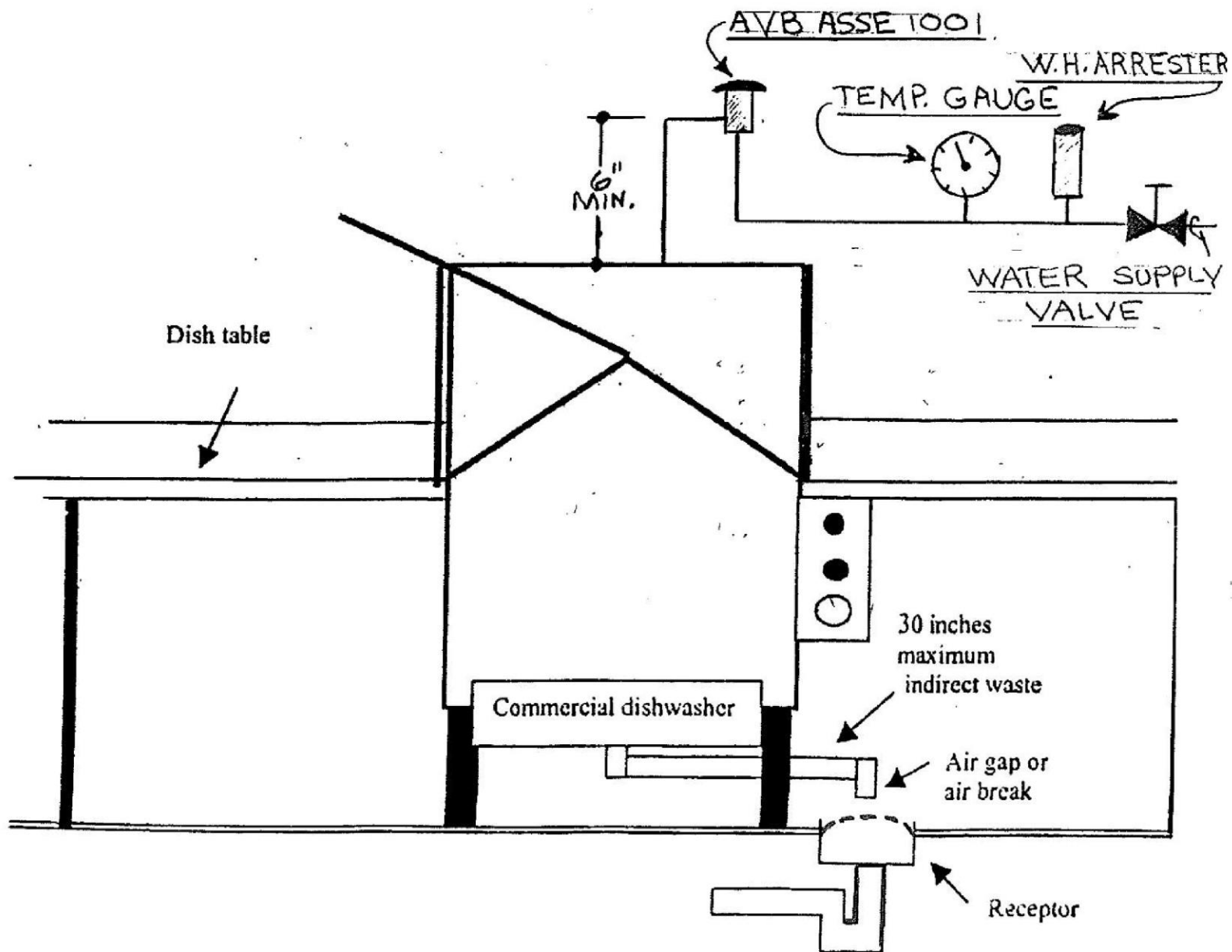
1. ASME A112.1.2 Air gap on water supply.
2. ASSE 1001 Pipe applied atmospheric vacuum breaker –
CHEMICALS MUST BE **DOWNSTREAM** OF VACUUM BREAKER. 1001 must be above flood level rim and no valves downstream.
3. ASSE 1013 Reduced Pressure Principle Back Flow Preventer.
Canadian standards-For ASSE use B64.1. For ASSE 1013
4. ASSE 1056 (CSA NO. 64.4) Spill Resistant vacuum breaker

COMMERCIAL DISHWASHERS

WITH SOAP DISPENSING SYSTEM

AVB MUST BE INSTALLED
6" ABOVE DOWNSTREAM
USE, FLOOD RIM, OR CHEM-
ICAL CONNECTION POINT





ELEVATOR - WATER POWERED

SPS 382.41 - Cross-connection control for a **water powered elevator** is based on a high degree of hazard for protection of the potable supply.

TYPES

This is not a very common piece of equipment in this area. The **water powered elevator** has a connection to the water supply. The water is used and re-used from the pit to maintain pressure in the elevator pumping system.

BACKFLOW PROTECTION

The water supply serving the water powered elevator must be protected to the highest degree to prevent any oils, or other contaminants from pit, from entering the water supply system. With the presence of oils, lubricants and possible chemicals it is important to protect all connections on the water supply system.

NOTE:

Backflow protector will be subject to backpressure.

APPROVED METHOD OF BACKFLOW PROTECTION

1. ASSE 1013 Reduced pressure principle backflow preventer

FIRE HYDRANTS

SPS 382.41(3) (b) 4.e. Cross-connection control for **fire hydrants** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

Fire Hydrants on public or private land will require backflow protection. The use of hydrants and metering is done through The City of Milwaukee Water Department. Inspecting of hydrants is the plumbing inspection department's responsibility. A high hazard cross connection situation shall be considered to exist at; the water supply piping connecting to the outlet of a fire hydrant for any purpose other than fire suppression.

BACKFLOW PROTECTION

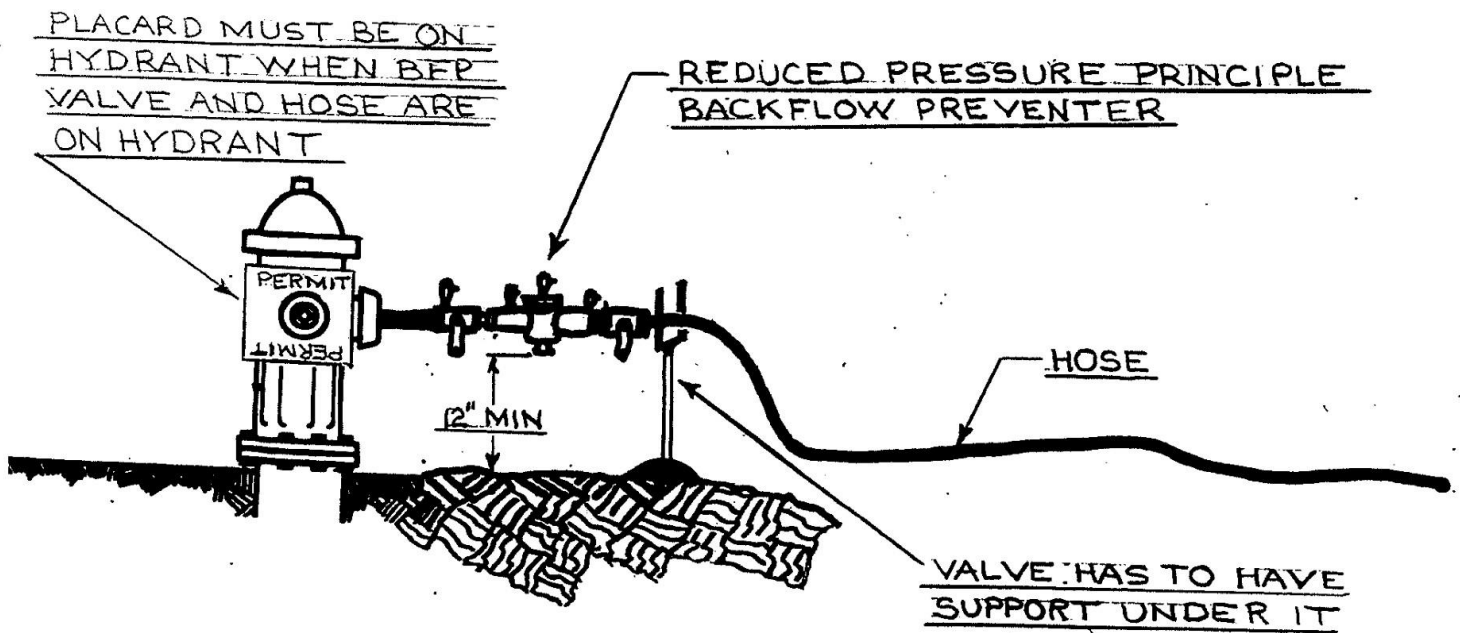
Hydrants must be protected from contamination caused from ground water, chemicals in tankers & back flushing of sewers to name a few. The use of R.P. valves will require testing annually and filing reports w/city only.

APROVED METHOD OF BACKFLOW PROTECTION

- | | |
|------------------|---|
| 1. ASME A112.1.2 | Air gap (tanker connections) |
| 2. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 3. ASSE 1011 | Vacuum breaker |
| 4. ASSE 1013 | Reduced pressure principle backflow preventer |
| 5. ASSE 1052 | Hose connection backflow preventer |

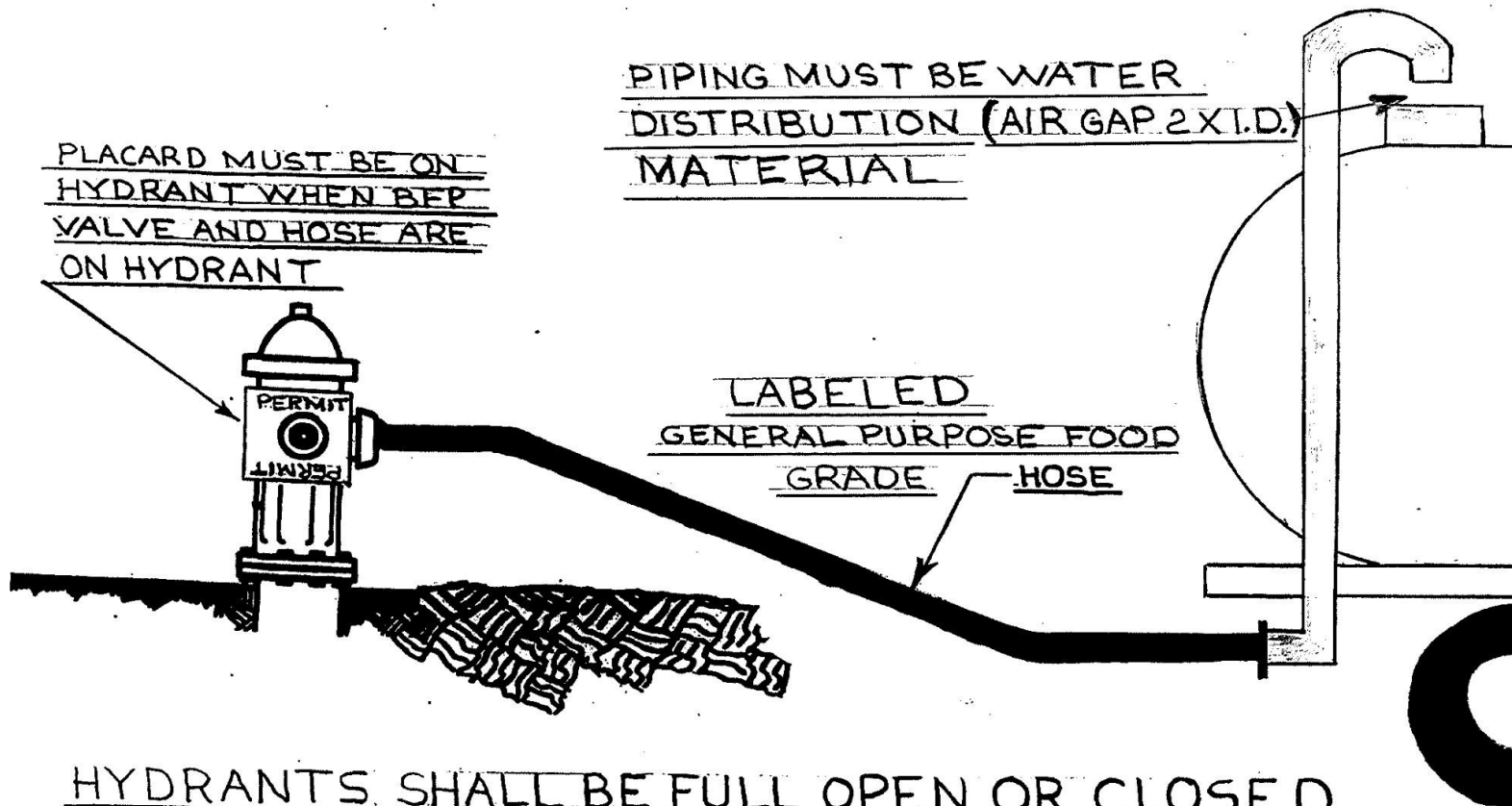
TEMPORARY HYDRANT CONNECTIONS

HOSE GUARDS SHALL BE USED ON ALL ROADWAYS



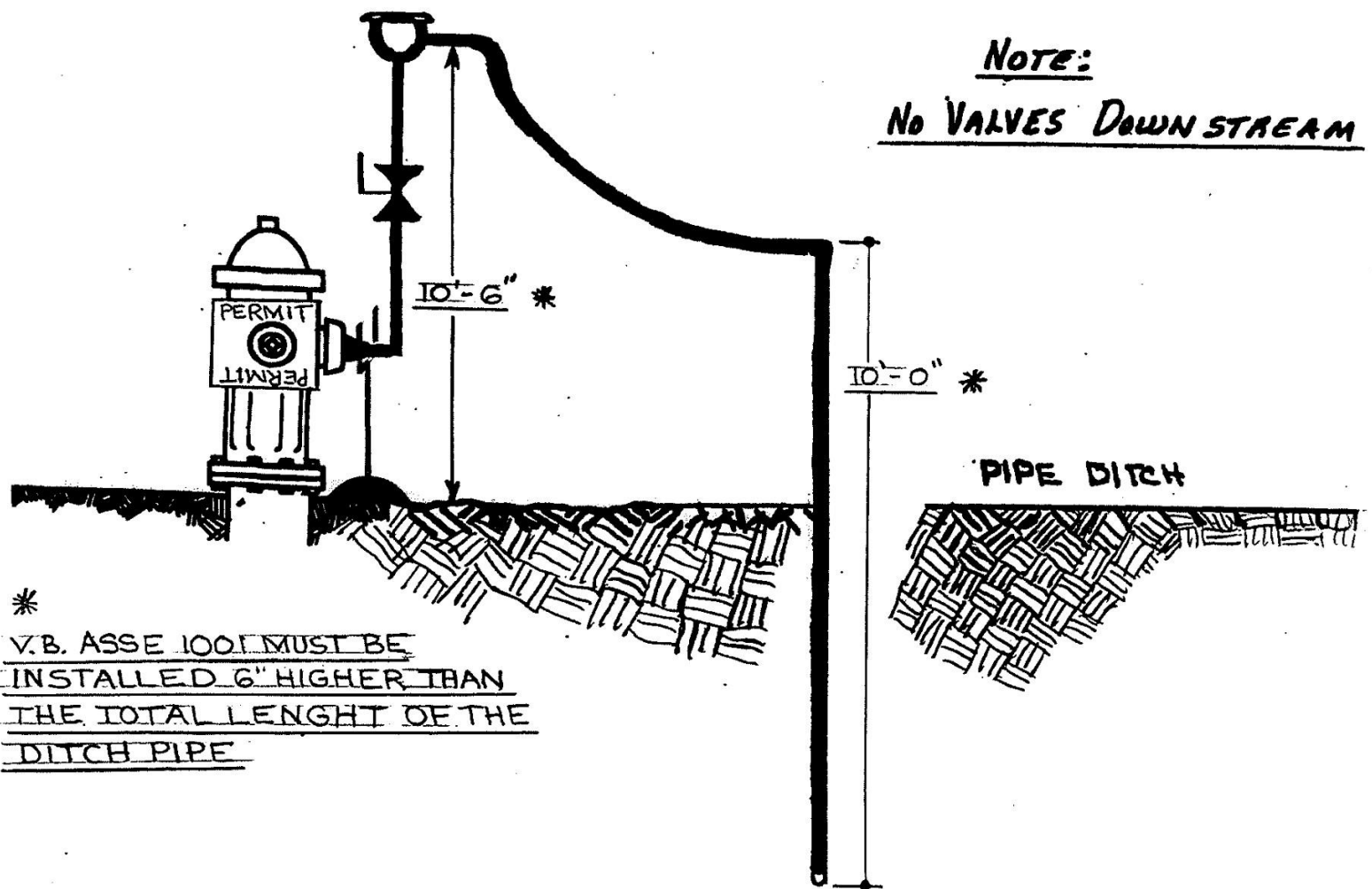
HYDRANTS SHALL BE FULL OPEN OR CLOSED
DO NOT USE HYDRANT FOR FLOW CONTROL
PER: CITY OF MILWAUKEE WATER DEPARTMENT

TEMPORARY HYDRANT CONNECTIONS FOR TANKER TRUCKS W/ BUILT IN AIR GAP ON TANK



HYDRANTS SHALL BE FULL OPEN OR CLOSED
DO NOT USE HYDRANT FOR FLOW CONTROL
PER: CITY OF MILWAUKEE WATER DEPARTMENT

TEMPORARY HYDRANT CONNECTION W/ V.B



MILWAUKEE WATER WORKS

PROPER USE AND OPERATION OF FIRE HYDRANTS

Operation of any fire hydrant is allowable only with a permit and is limited only to the hydrant designated.

A hydrant wrench is the only allowable wrench.

When used, a hydrant must be opened to its full capacity (17-21 turns). Because of the drain valve, a hydrant should never be used "half-open." Look for arrow at top of hydrant showing direction to open. To regulate flow, a hose bib or glove valve must be attached to the nozzle ahead of the hose. A BACKFLOW PREVENTOR IS REQUIRED WITH HOSE CONNECTIONS BECAUSE OF STATE DEPT. OF NATURAL RESOURCES REGULATIONS.

The operating nut turns easier when closing than when opening. Closing must not be rapid, but must be deliberately slow because of water hammer.

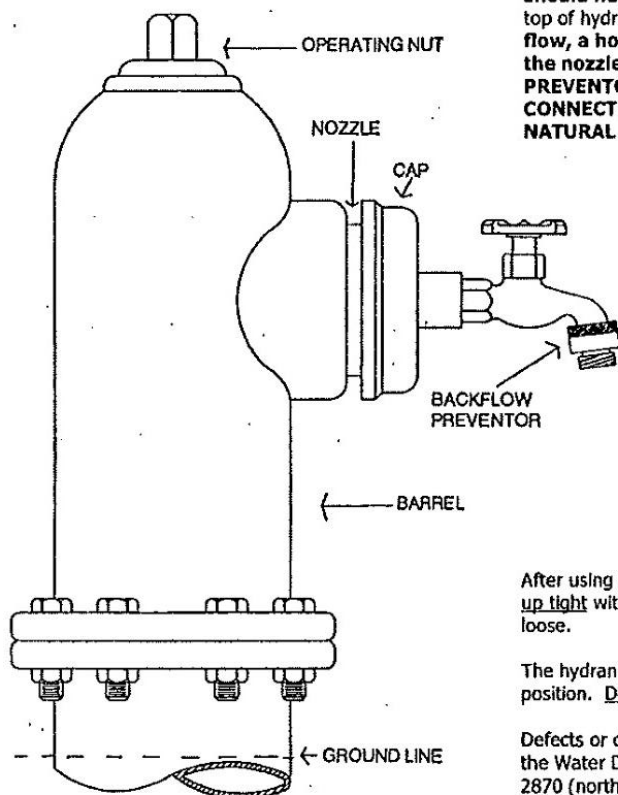
When use of the hydrant is completed, the operator shall look inside the hydrant nozzle and observe that the water level inside the barrel is dropping, indicating that the hydrant drain valve is operating properly. The hydrant cap should not be replaced until the water level inside the barrel had dropped below ground level.

After using a hydrant, the hydrant nozzle cap shall be run up tight with a hydrant wrench. Do not leave the cap loose.

The hydrant operating nut shall be left in the tight closed position. Do not stack off after tight closing.

Defects or difficulty with a hydrant must be reported to the Water Distribution Division at once. Telephone 286-2870 (north) or 286-2875 (south).

Hydrants marked, "FIRE DEPT. ONLY", shall not be used. Request a change in the hydrant designated on the permit.



FIRE SPRINKLER BACKFLOW DEVICES

WHAT TO LOOK FOR – (includes assemblies and by-passes).

- A. Identify the manufacturer, model number, and serial number.
- B. Assembly size and type.
- C. If all the PSID numbers are the same, there is something wrong.
(**ALWAYS** check forward and actual flow rate).
- D. Person testing fire sprinkler backflow devices must have both the Cross Connection Control Tester Registration and the Sprinkler Fitter Credential.

APPROVED METHODS OF BACKFLOW PROTECTION

- 1. ASSE 1013 Reduced pressure principle backflow preventer
- 2. ASSE 1015 (water only) Double check valve assembly
- 3. ASSE 1047 Reduced pressure detector
- 4. ASSE 1048 (water only) Double check detector

*For registration requirements see Tables SPS 382.22.1; SPS 382.41.2

FOOD WASTE GRINDER - COMMERCIAL

SPS 382.41 - Cross-connection control for **food waste grinder** is based on a high degree of hazard for the protection of the potable water supply.

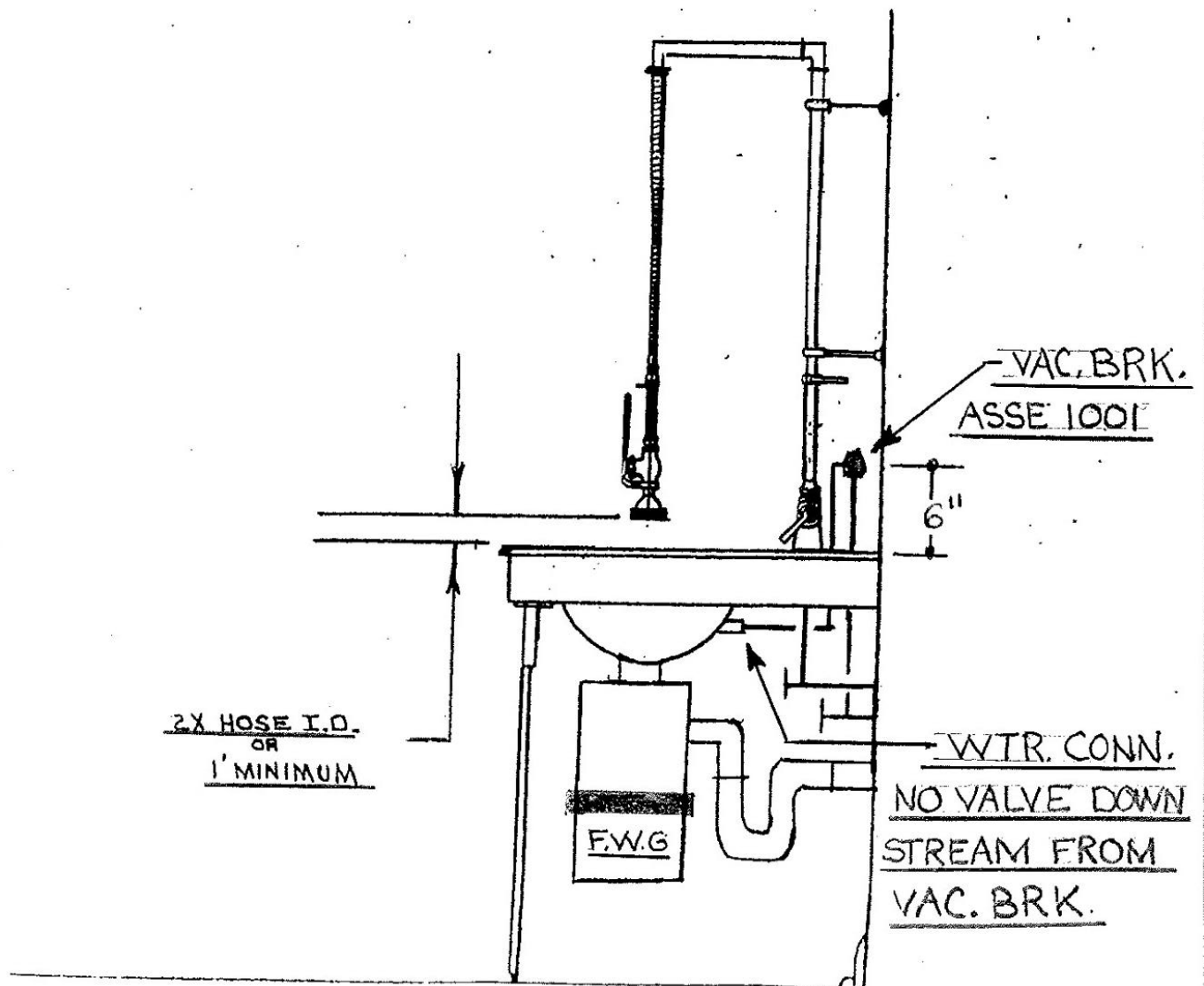
TYPE

1. Residential 2hp or less
2. Commercial 3hp or more

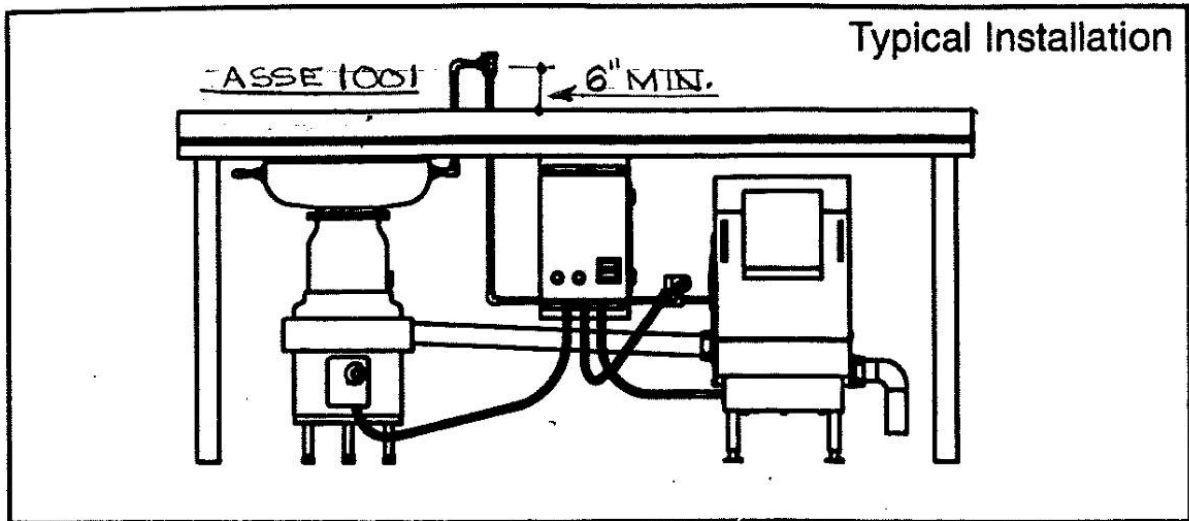
APPROVED METHOD OF BACKFLOW PROTECTION

1. ASSE 1001 Pipe applied atmospheric vacuum breaker
2. ASSE 1013 Reduced pressure principle backflow preventer
3. ASSE 1056 Spill Resistant vacuum breaker

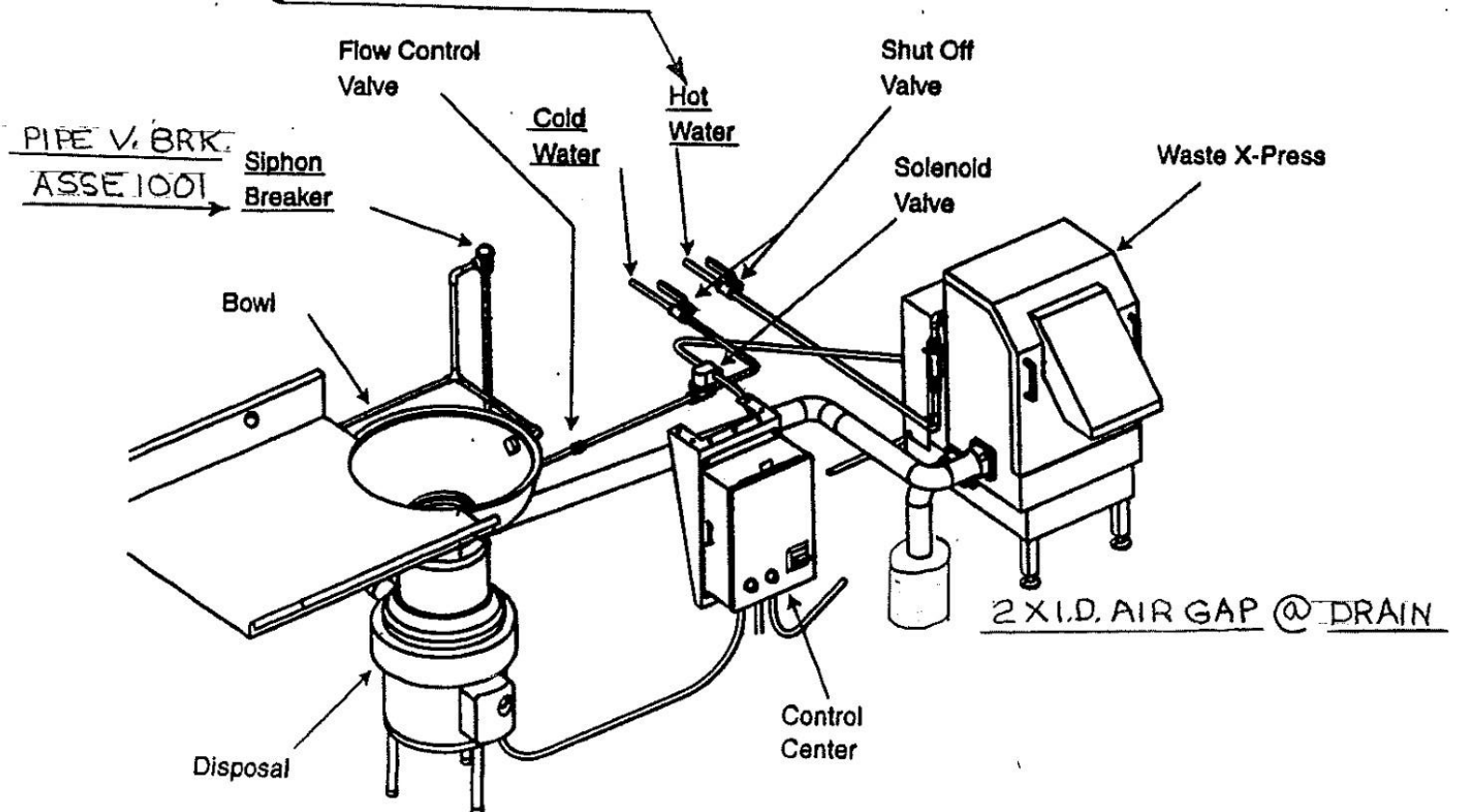
FOOD WASTE GRINDER



FOOD WASTE REDUCTION SYSTEM



HOT WATER SUPPLY IS ABOVE FLOOD RIM NO BFP REQ.



FUNERAL HOMES

SPS 382.41 - Cross connection for equipment in **Funeral Homes** is based on a high degree of hazard for the protection of the potable water supply. When inspecting **Funeral Homes**, in addition to restrooms and sinks, there are several areas to look for. These areas include, but are not limited to:

TYPES:

- 1. Embalming Machine** – Water is used for mixing with embalming fluids.
- 2. Embalming Table** – Water is provided to rinse and clean table.
- 3. Aspirator** – Water is used to assist with the evacuation of body tissues and fluids.
- 4. Salon Sinks** – Look for proper BFP on salon sinks, if present.

BACKFLOW PROTECTION

The water supply serving **Funeral Home** equipment must be protected for a high degree of hazard to prevent chemicals, body fluids and tissues from entering the water supply.

APPROVED METHODS OF BACKFLOW PROTECTION:

- | | |
|--------------|---|
| 1. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 2. ASSE 1011 | Hose connection vacuum breaker |
| 3. ASSE 1013 | Reduced zone backflow preventer |
| 4. ASSE 1052 | Hose connection backflow preventer |
| 5. ASSE 1056 | Spill Resistant vacuum breaker |

GENERATOR – WATER COOLED

SPS 382.41 – Cross-connection control for **water cooled generators** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

Cooling lines that run through single wall jackets must be protected to a high degree of hazard.

NOTE:

Pipes wrapped around the generator and double wall cooling jackets need no backflow protection other than an air gap on discharge of cooling line.

BACKFLOW PROTECTION

The water supply serving the **water cooled generator** must be protected to a high degree of hazard to prevent drain water or lubricant fluids from entering the water supply system.

APPROVED METHOD OF BACKFLOW PROTECTION

- | | |
|------------------|--|
| 1. ASME A112.1.2 | Air gap on discharge cooling line |
| 2. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 3. ASSE 1013 | Reduced pressure principle back flow preventer |

GLASS RINSER

SPS 382.41-Cross-connection control for a **glass rinsers** is typically based on a **low** degree of hazard.

NOTE:

If rinser is used to clean dirty glasses or the spray head can be submerged, the degree of hazard becomes **high**. Glass rinsers are intended to refresh clean glasses.

TYPES

There are two types of glass rinsers, one of which the head is above the food level and the other it is submerged.

BACKFLOW PROTECTION

The protection required on the water supply serving the glass rinser depends on the use and where the spray head is located.

Glass rinsers may have more than one water supply, and each individual supply must be protected.

APPROVED METHOD OF BACKFLOW PROTECTION

Low Hazard

- | | |
|--------------|----------------------------------|
| 1. ASSE 1012 | Dual check with atmospheric vent |
|--------------|----------------------------------|

High Hazard

- | | |
|--------------|-------------------------------------|
| 1. ASSE 1013 | Reduced pressure backflow preventer |
| 2. ASSE 1056 | Spill Resistant vacuum breaker |

Undercounter Mount Glass Rinser



Undercounter Mount Glass Rinser - Stainless Steel

Add the improved hygiene and dispense features of a glass rinser to any bar with this undercounter mount model.

Unlike competitors, the tray/mount is constructed of heavy gauge stainless steel for durable long-lasting performance. The water rinser and glass actuator are robust metal and stainless construction also.

Condition the glass the moment before dispensing:

- Rinse away any impurities that might be in the glass.
- Chill the glass utilizing cold water.
- A wetted glass pours better.

The setup for a perfect glass of draft beer. Impress your guests with the art of draft beer dispensing! They'll all know you care about the beer when the glass is rinsed and conditioned before the beer is dispensed.



Series Type	Undercounter Mount
Material	18 Gauge Stainless Steel
Threaded Drain for 1/2" Drain Hose	3-1/2" x 1/2"
Water connection	External-1/2" BSP (standard plumbing connection)
or	Internal thread 1/2"-20 for hose barb connection

Rinser Water Inlet Installation:

- Always check local plumbing codes first.
- Install in-line water regulator set at 15 PSI from the street water supply (no greater, perfect operating pressure).
- Install in-line one way check valve from the street water supply (prevents pressure drop which can cause leaking).
- Install in-line shut-off for the rinser system from the street water supply (this must be turned off nightly).
- If teed into soda system make sure system can handle the increased water demand. Have plumber install a 45° 1/2" O.D. barb for the drains if line is not hard plumbed into the system.
- Install a shut-off for the water supply if line is not hard plumbed into the system.

GLASS WASHER

SPS 382.41 - Cross connection control for **glass washers** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

Glass washers are generally found behind bars or at waitress stations in taverns and restaurants. The **glass washer** can be of a conveyor type or rack type, similar to residential dish washers. The **glass washer** is used to handle a high volume of glasses without tying up the dishwasher.

BACKFLOW PROTECTION

The water supply serving the **glass washer** must be protected to the highest degree. Some **glass washers** have factory installed vacuum breakers. The vacuum breakers installed at the factory can be concealed and may take some extra time to find.

APPROVED METHOD OF BACKFLOW PROTECTION

- | | |
|---------------------|---|
| 1. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 2. ASSE 1013 | Reduced pressure principle backflow preventer |
| 3. ASSE 1056 | Spill Resistant vacuum breaker |

HAND HELD SHOWERS

SPS 382.41 - Cross-connection control for **hand held shower** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

Any shower head attached to a hose will fall into this category. If unit attaches to a slide bar or stationary bracket it is looked at the same way for backflow protection.

BACKFLOW PROTECTION

Hand held showers must be protected to the highest degree to prevent any toxins or contaminants from being siphoned into potable water supply. The concern here is the same as is with any fixture involving a hose. The end of a **hand held shower** could be left in a bucket of cleaner or in a plugged drain.

APPROVED METHOD OF BACKFLOW PROTECTION

1. ASME A112.18.3 For the faucet, or the faucet must meet current ASME standards for backflow protection in the State of Wisconsin.
2. ASSE 1001 Pipe applied atmospheric vacuum breaker
3. ASSE 1014 In-line hose vacuum breaker specific for hand held devices may not be employed in back pressure situations of more than 5 ft. of water column.

HEAT EXCHANGERS

SPS 382.41(3) (d) Prohibitions. The use of a toxic solution as a heat transfer fluid in a single wall **heat exchanger** for potable water is prohibited.

(Heat exchangers are classified into two categories, single wall and double wall. Double wall **heat exchangers** have a visible vent port for leak detection. The **heat exchanger** is the backflow preventer.)

TYPES

1. Double wall **heat exchanger** uses a toxic solution to heat or cool potable water.
2. Single wall **heat exchanger** uses potable water to heat or cool potable water.

NOTE:

1.382.41 (3) (b) 4. d. A high hazard cross connection situation shall be considered to exist at a chemical pot-feeder or automatic chemical feeder installed to serve a boiler, cooling tower or chilled water system.

2. Heat exchangers are common in buildings with multi-piping systems. The type of the heating or cooling solution used is the determining factor for single wall or double wall heat exchanger requirements. If the transfer fluid is toxic, the **heat exchanger** must be double walled.

HOOD WASH DOWN SYSTEMS

SPS 382.41 – Cross-connection control for **hood wash down systems** is based on a high degree of hazard for the protection of the potable water supply.

NOTE:

The drain on unit must remain full size from trap to receptor w/air gap. Drain Line serving receptor must discharge to grease trap.

TYPES

The **hood wash down systems**, of concern, have spray nozzles in hood which are connected to the potable water system. Some systems have chemical injectors while others require manual spray of chemicals.

BACKFLOW PROTECTION

The water supply serving **hood wash systems** must be protected to the highest degree to prevent toxins from entering the water supply. By using the highest degree of protection this will prevent any toxins from chemicals being used to clean grease as well as any contaminants in the grease from getting back into the water supply.

APPROVED METHOD OF BACKFLOW PROTECTION:

HIGH HAZARD

- | | |
|--------------|---|
| 1. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 2. ASSE 1013 | Reduced Pressure Principle Backflow Preventer |
| 3. ASSE 1056 | Spill Resistant vacuum breaker |

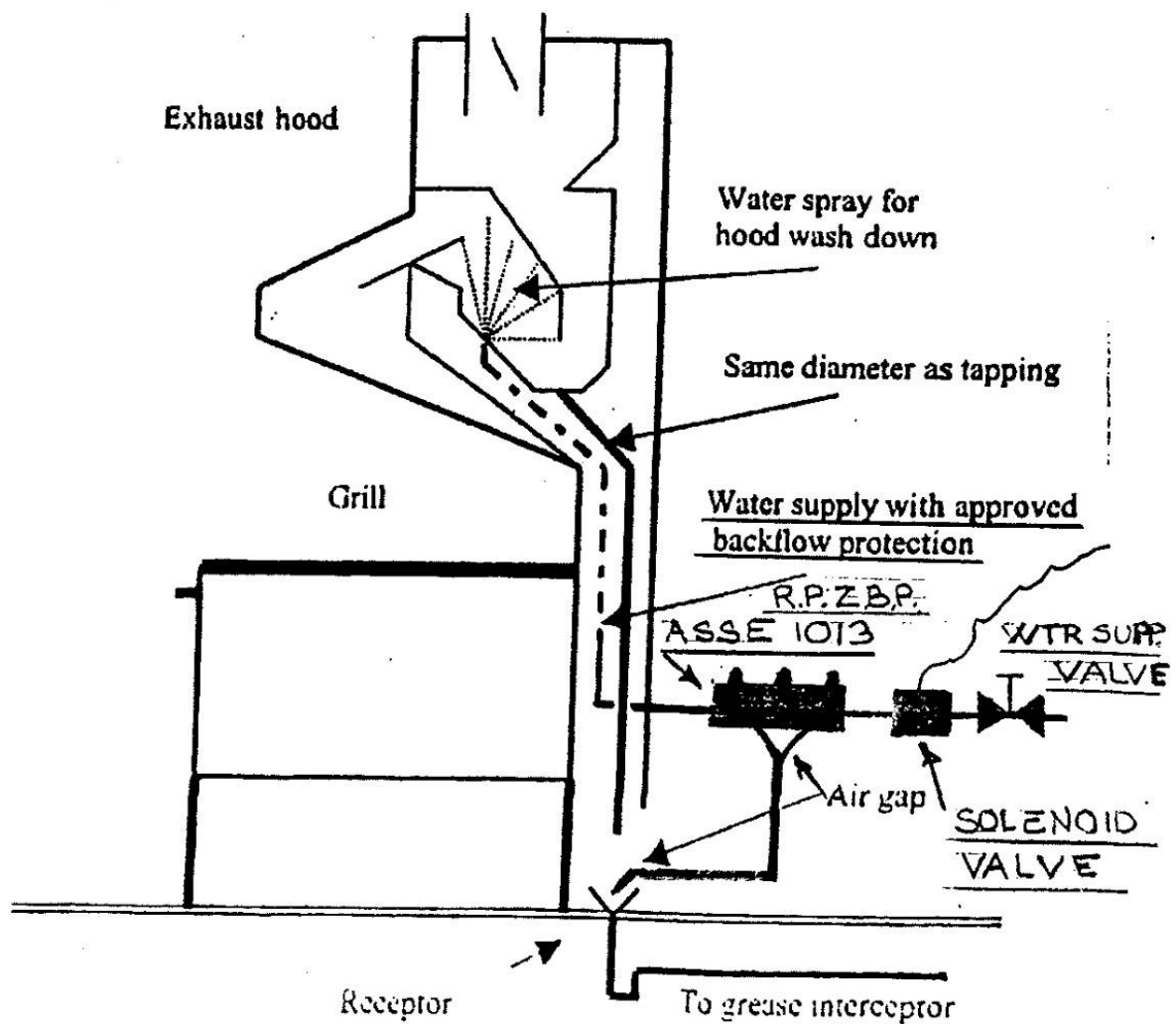
EXHAUST HOOD WATER WASH DOWN

FOR GRILLS

W/ REDUCED PRESSURE ZONE BACKFLOW

PREVENTERS ASSE 1013

DEGREASER MAY BE USED AFTER B.F.P.



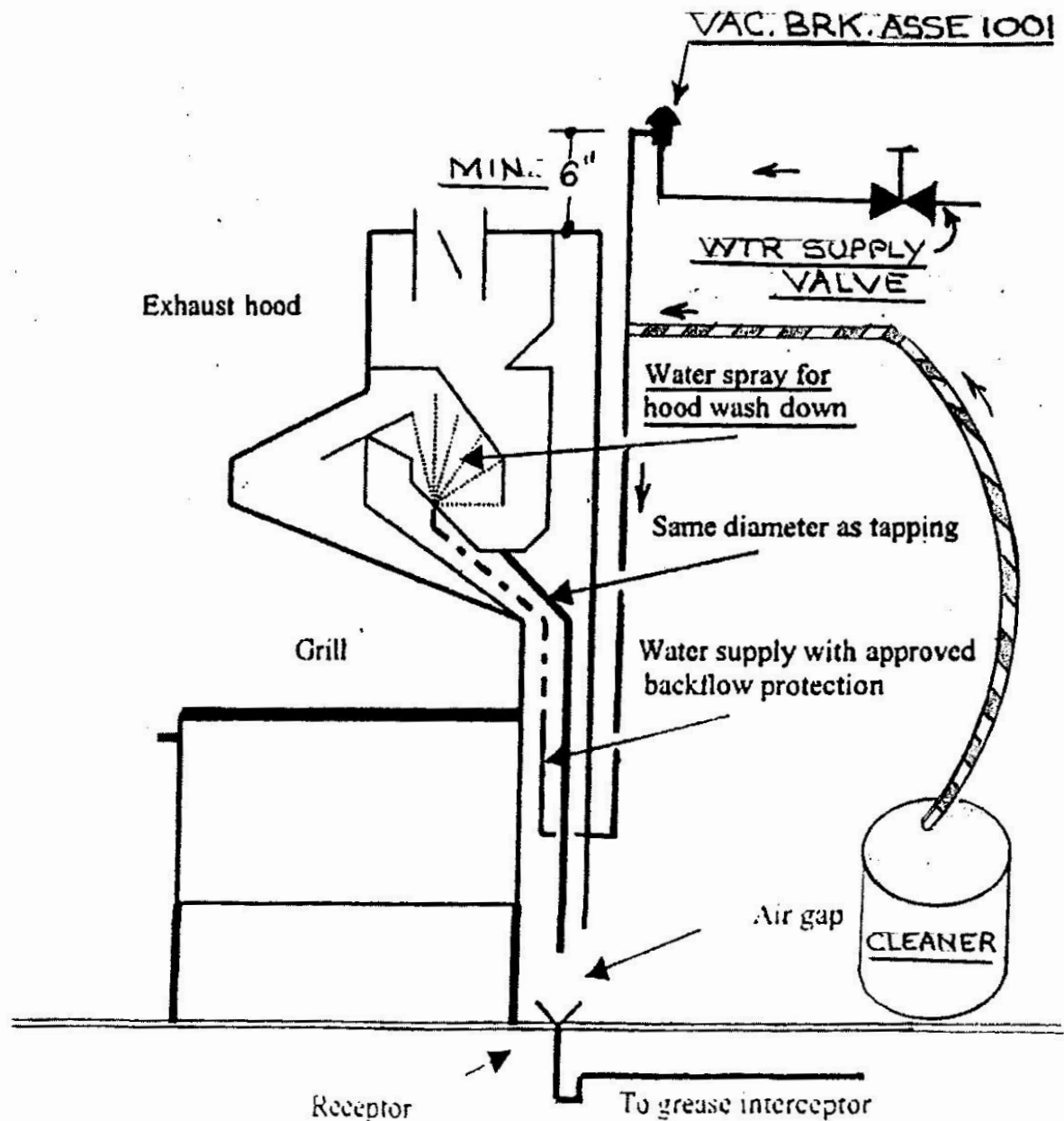
EXHAUST HOOD WATER WASH DOWN

FOR GRILLS

W/ATMOSPHERIC VACUUM BREAKER

ASSE 1001

DEGREASER MAY BE USED AFTER VAC. BRK.



HOSE BIBBS

SPS 382.41 – Cross-connection control for a **hose bibb** is based on a **high** degree of hazard for the protection of the potable water supply. It is recommended that the spout be 12 inches above grade.

TYPES

Hose bibbs are generally protected by **ASSE 1011** or **ASSE 1052** vacuum breakers.

These vacuum breakers cannot be used in back-pressure situations of more than 10 feet of water column, and are limited to non-continuous pressure, 1 hours or less.

NOTE:

An exception to the 12-hour rule are camp grounds and marinas.

SPS 382.41 (4) (c) 1. a. (Campgrounds and marinas require an RP valve upstream of hose bibbs.)

BACK FLOW PROTECTION

The water supply serving **hose bibbs** must be protected to the highest degree to prevent any toxins from entering the water supply. The uncertainty and concern of where the end of the hose could be left is what creates a high hazard situation.

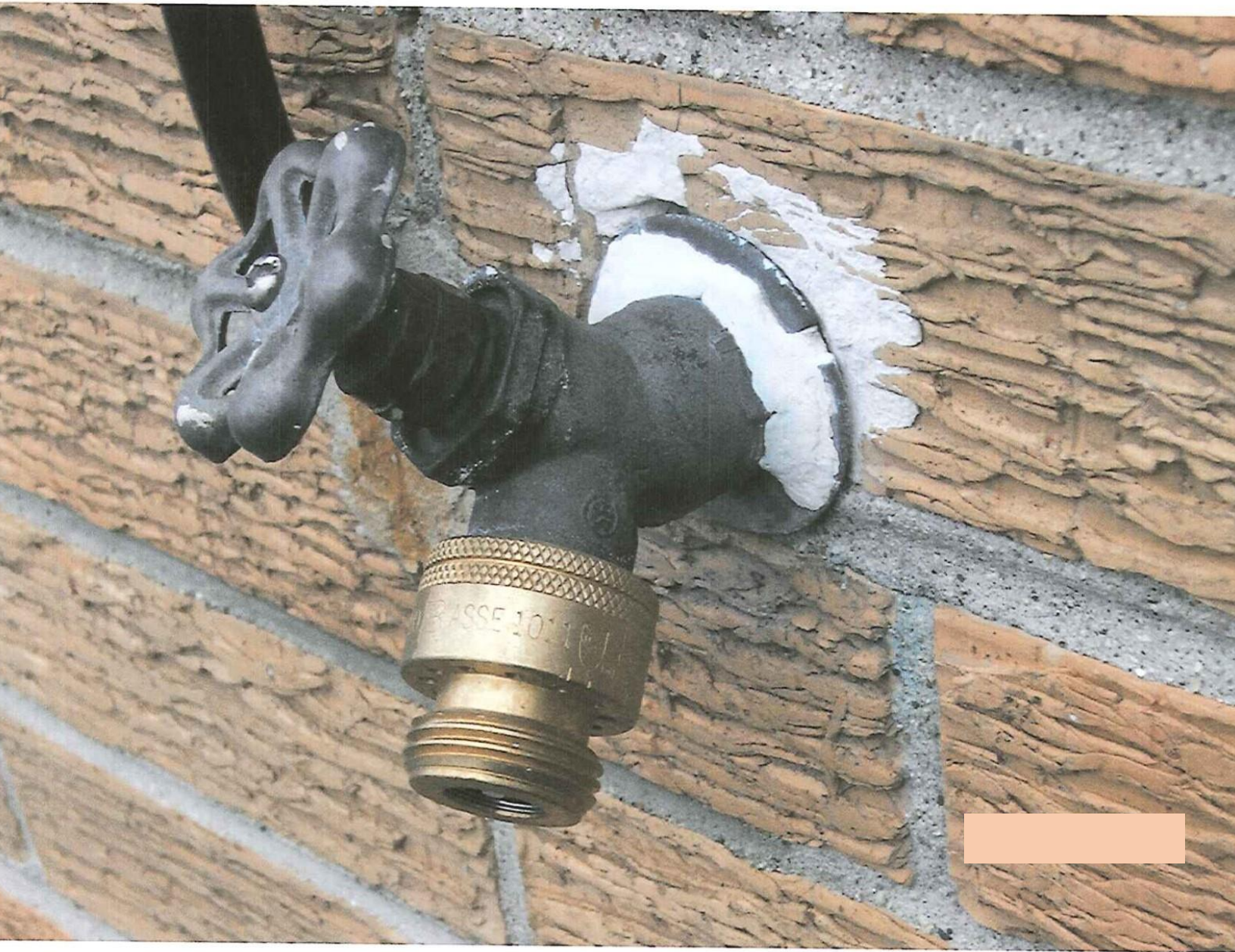
NOTE:

Hose thread connections installed for the sole purpose of: Draining a water supply system, obtaining water quality samples of the water supply system, or connecting individual residential automatic clothes washers shall not require the APPROVED METHODS OF BACKFLOW PROTECTION listed in this chapter.

APPROVED METHOD OF BACK FLOW PROTECTION

ASSE 1001	Pipe applied atmospheric vacuum breaker
ASSE 1011	Hose connection vacuum breaker
ASSE 1052	Hose connection backflow preventer





HOSE AND SPRAY

SPS 382.41 – Cross-connection control for a **hose and spray** is based on a high degree of hazard for the protection of the potable water supply.

NOTE:

All faucets used w/**hose sprayers** must have built in check valves

BACK FLOW PROTECTION

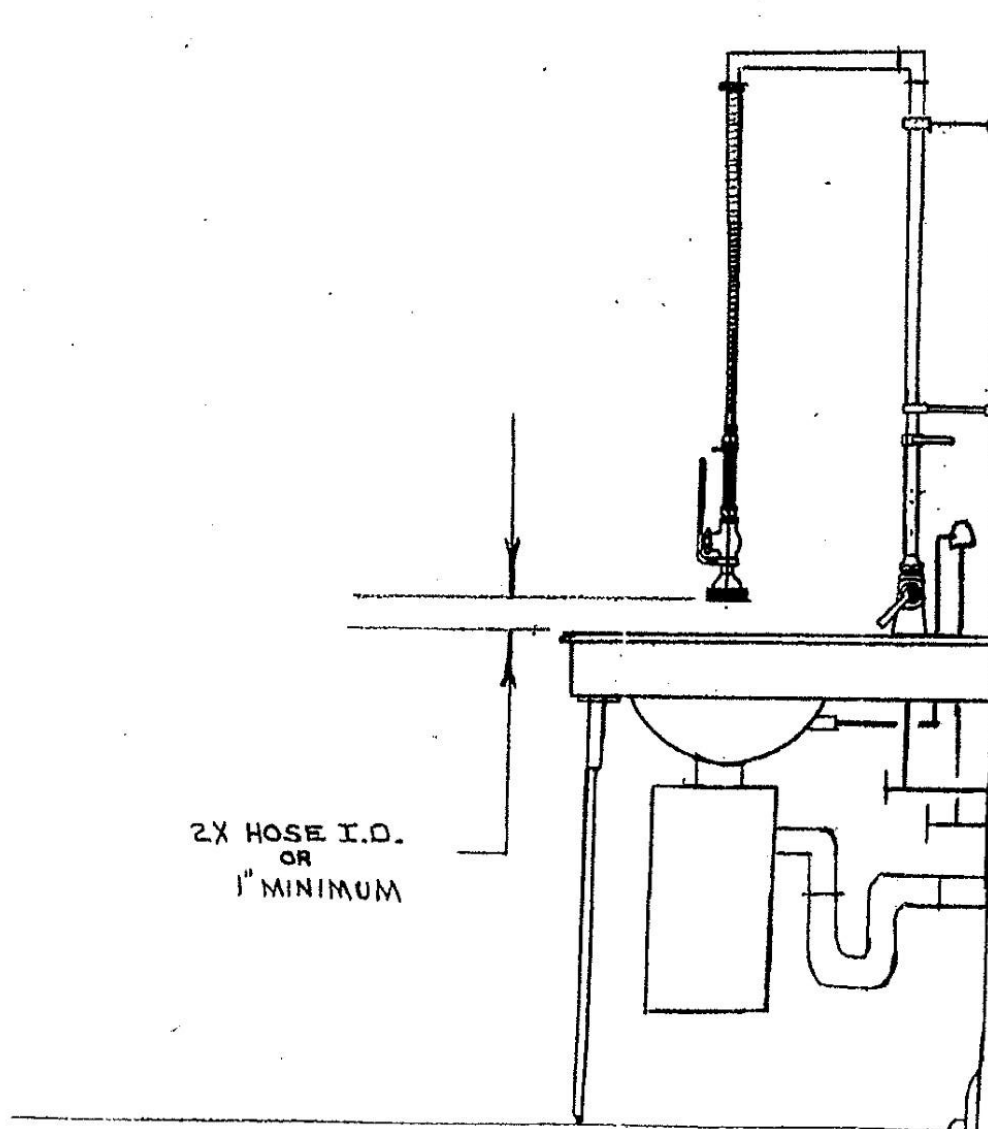
The water supply serving the **hose and spray** fixture must be protected to prevent drain water or water with chemicals from entering the water supply.

APPROVED METHOD OF BACK FLOW PROTECTION

1. ASME 112.18.3- Internal check
2. Air gap on sprayer A112.1.2-Sprayer above the flood level rim of the fixture.
3. ASSE 1001 Pipe applied atmospheric vacuum breaker
4. ASSE 1013 Reduced pressure principle backflow preventer
5. ASSE 1056 Spill resistant vacuum breaker

KITCHEN HOSE SPRAYERS

Cross-connection control for kitchen hose sprayers is based on their high degree of hazard for the protection of the drinking water. The ANSI 112.1.2 air gap is the most common way of protecting the drinking water supply from the kitchen sink basin. The sprayer when hanging free must maintain an airgap between the end of the sprayer and the rim of the sink of at least 2 times the diameter of the effective opening of the sprayer hose. There is a 1" minimum, or in other words if the sprayer hose inside diameter is $\frac{1}{4}$ " the air gap is not $\frac{1}{2}$ " but is 1".



AIR GAP

HUMIDIFIERS

SPS 382.41 - Back flow protection for **humidifiers** is based on both a high and low degree of hazard to prevent contamination of the potable water supply.

TYPES

There are several types of water supplied **humidifiers**, some with steam injection. Some units have built in air gaps and, some have submerged inlets. In order to determine what backflow protection is needed, the unit may need to be opened, or a copy of the unit's schematics may need to be obtained to see how water flows through the unit.

BACKFLOW PROTECTION

The water supply serving the **humidifier** must be protected to the highest degree for units that are steam injected to prevent a possible back pressure situation. **Humidifiers** are also protected to a low degree of hazard to prevent contaminants that may grow in the unit from entering the potable water supply system.

APPROVED METHODS OF BACKFLOW PROTECTION

- | | |
|------------------|---|
| 1. ASME A112.1.2 | Manufactured air gap inside unit |
| 2. ASSE 1012 | Dual check with atmospheric vent |
| 3. ASSE 1013 | Reduced pressure principle backflow preventer |

HYDRANTS- WALL AND YARD

SPS 382.41 – Cross-connection control for **hydrants (wall or yard)** is based on high degree of hazard for the protection of the potable water supply.

TYPES

Wall Hydrants – ASSE 1019A & B have approval. ASSE 1019C has alternate approval. This hydrant shall be freeze resistant, self-draining and have integral backflow protection. This hydrant will typically serve wading pools, therapeutic pools, swimming pools, gardening hoses, etc. Maximum of 10 feet of head pressure. Recommended 12 inches above grade.

Yard Hydrants - ASSE 1011 and 1052. Hydrants that bleed (drain) into ground as well as hydrants that are flush with the grade are **prohibited**. These are typically found at garden centers, garbage dumpster sites, farms, etc. The new standard as of 2001, ASSE 1057 is for freeze-resistant sanitary yard hydrants w/backflow protection.

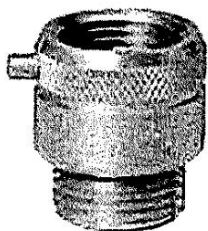
APPROVED METHODS OF BACKFLOW PROTECTION:

- | | |
|--------------|---|
| 1. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 2. ASSE 1011 | Hose connection vacuum breaker |
| 3. ASSE 1013 | Reduced zone backflow preventer |
| 4. ASSE 1020 | Pressure vacuum breaker |
| 5. ASSE 1052 | Hose connection backflow preventer |
| 6. ASSE 1056 | Spill Resistant vacuum breaker |

NOTE:

Commercial hose reels must be protected with an ASSE 1013, ASSE 1056, or an ASSE 1020 (outside use only). THERE ARE NUMEROUS STATE OF WISCONSIN PRODUCT APPROVALS FOR YARD AND WALL HYDRANTS.

APPROVED CROSS-CONNECTION CONTROL DEVICES FOR HOSE THREADS



OR



ASSE 1011

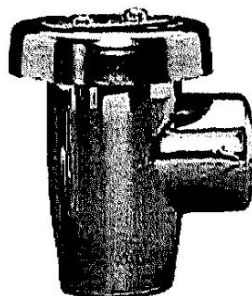
ASSE 1052

Installed on the hose
threaded spout end.

OR

ASSE 1001

Installed 7'-6" above
the finished floor.



ICE MACHINES

SPS 382.41-Cross-connection control for **Ice Machines** is based on a high degree of hazard.

TYPES

Ice Machines with a single water connection, (water for making ice only) does not require additional backflow protection, (if protected by air gap in machine)

Ice Machines with 2 water connections (compressor cooling water and ice making supply water) should have each connection protected separately by approved methods listed below.

BACKFLOW PROTECTION

The drain water coming from **Ice Machine** must be protected by an air gap to prevent the ice from being contaminated by waste water.

Ice Machines w/ & w/o beverage systems connected should be protected with separate drains and air gaps from the ice bin and ice maker to a receptor

APPROVED METHODS OF BACKFLOW PROTECTION

- | | |
|------------------|--|
| 1. ASME A112.1.2 | Water for making ice only (single water connection w/air gap in unit). |
| 2. ASSE 1001 | Air gap on drain required. |
| 3. ASSE 1013 | Pipe applied atmospheric vacuum breaker |
| 4. ASSE 1056 | Reduced pressure principle backflow preventer |
| | Spill Resistant vacuum breaker |

IRRIGATION SYSTEMS

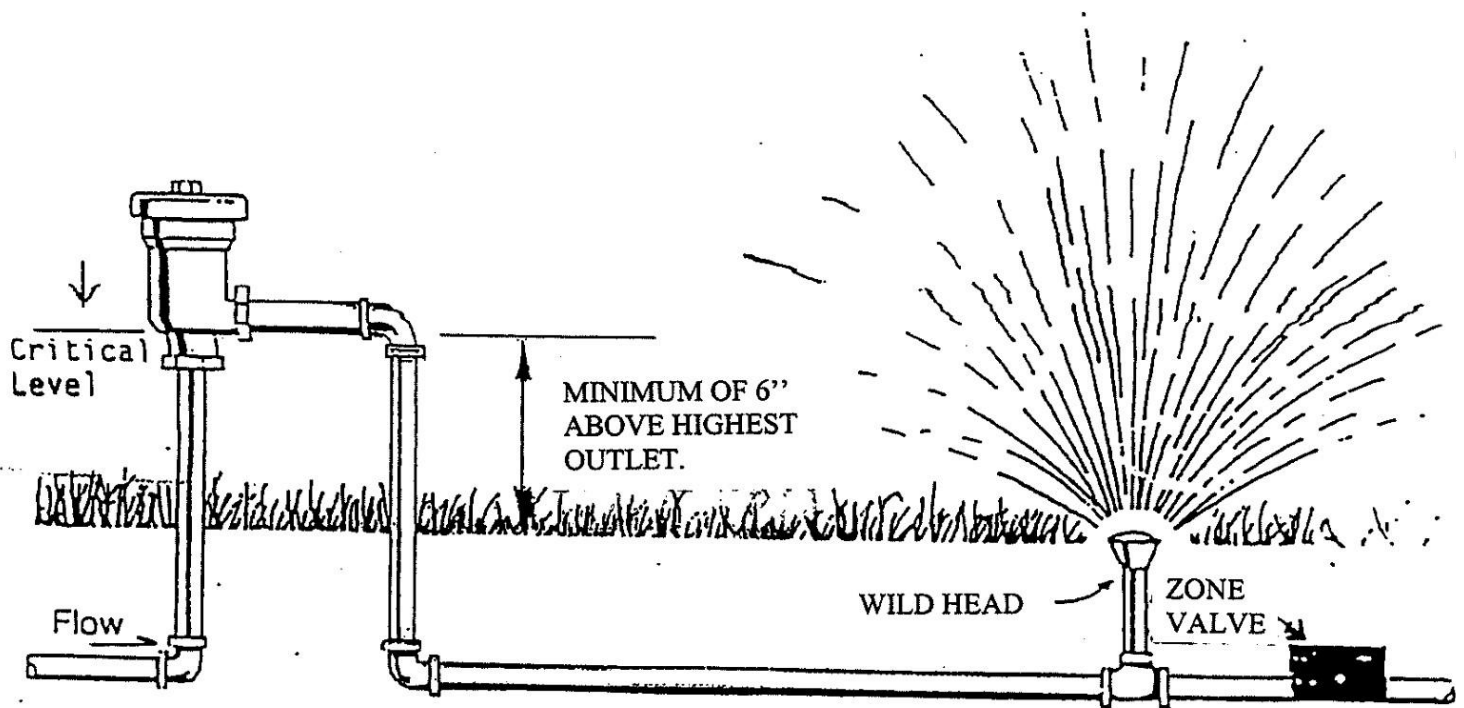
SPS 382.41 - Cross-connection control for **Irrigation Systems** is based on a **high** degree of hazard for the protection of the potable water supply.

BACKFLOW PROTECTION

The main concern for back flow protection is to protect against back-siphonage w/lawn fertilizers and chemicals.

APPROVED METHOD OF BACKFLOW PROTECTION

1. ASSE 1001 Pipe applied atmospheric vacuum breaker /no valves permitted downstream. (Wild Head)
2. ASSE 1013 Reduced pressure principle backflow preventer
3. ASSE 1020 Pressure vacuum breaker
4. ASSE 1056 Spill resistant vacuum breaker

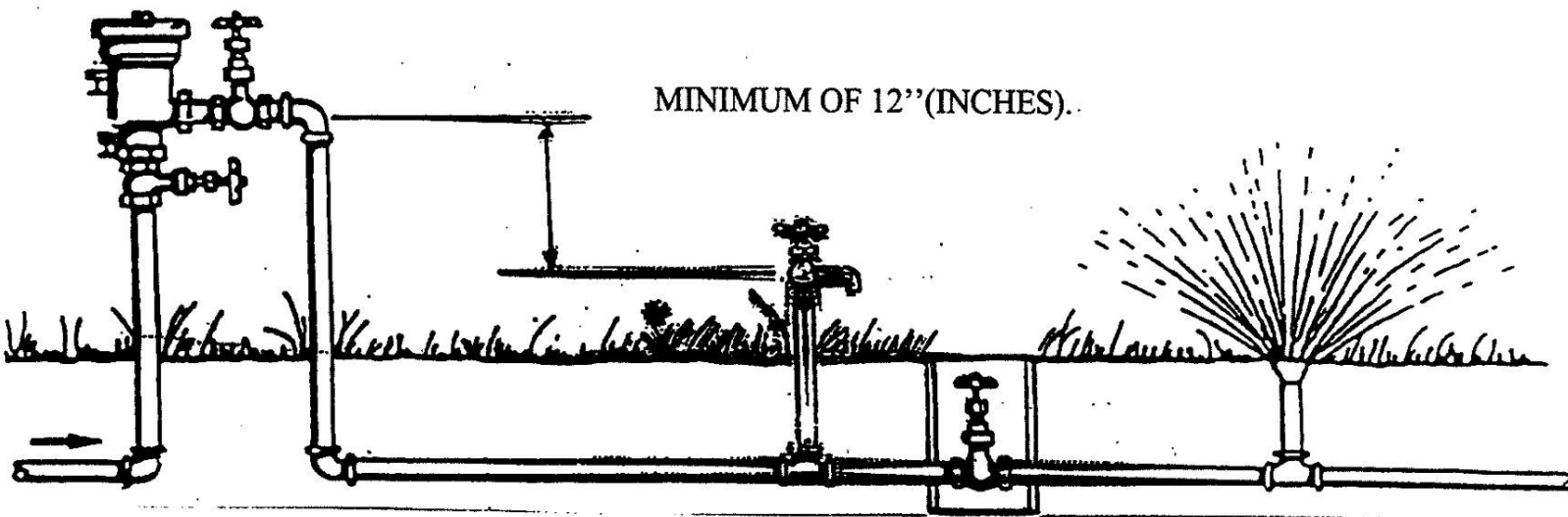


**ATMOSPHERIC TYPE VACUUM BREAKER WITH TURF
SPRINKLER**

A.S.S.E. 1001

APPROVED INSTALLATION OF PRESSURE VACUUM BREAKER

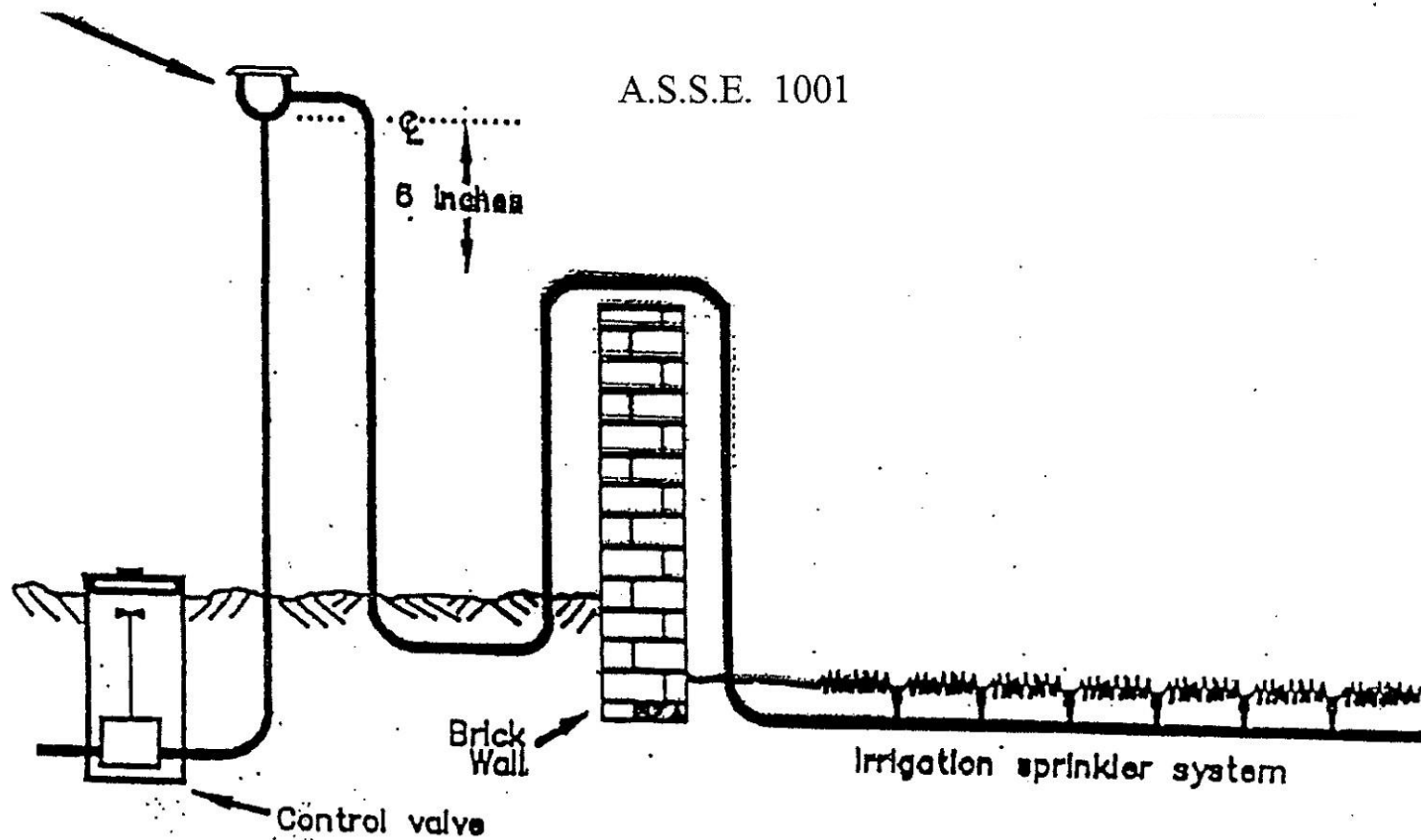
A.S.S.E. 1020



DOWNSTREAM SIDE OF VACUUM BREAKER MAY BE MAINTAINED UNDER PRESSURE BY A VALVE BUT THERE SHOULD BE **ABSOLUTELY** NO POSSIBILITY OF IMPOSING **BACKPRESSURE** BY A PUMP OR OTHER MEANS.

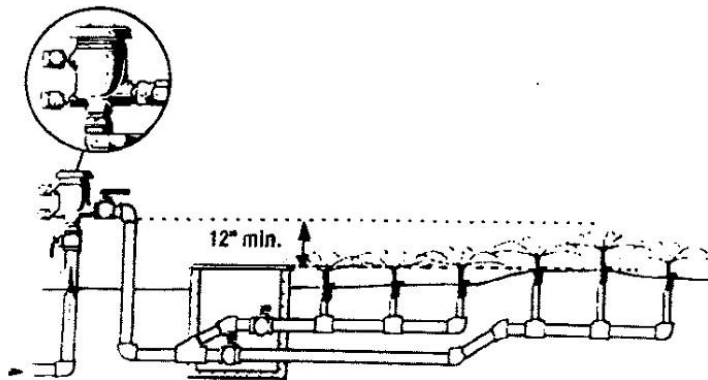
ATMOSPHERIC VACUUM BREAKER

A.S.S.E. 1001



P.V.B...PRESSURE VACUUM BREAKER ASSE 1020

- Only one PVB required to protect the whole system; (on/off valves) can be located downstream of the PVB.
 - PVB's must be installed a minimum of (12'') above the highest point of water in the sprinkler system.
 - PVB's **must** be tested by a State-certified Backflow Assembly tester...when installed..then annually or when moved or repaired.
 - NO** chemical or fertilizer can be introduced into an irrigation system protected with PVB's.
 - NO** pumps or sources for back pressure on down-stream side of (after) an PVB.
 - Anti-siphon, multi zone.
- Can be pressurized for a full **24 hours**.



A.S.S.E. 1020

KIDNEY DIALYSIS

SPS 382.41 Cross-connection control for a **Kidney Dialysis** machine is based on **high** degree of hazard for the protection of the potable water supply.

BACKFLOW PROTECTION

Containment and isolation are required backflow protection for this situation. A reduced pressure zone backflow preventer (RP) is required for containment. Isolation is achieved by an air gap or another RP at each chair.

The R.O. water does not require any backflow protection. Brass backflow protectors installed before R.O. system however, create a change in the pH of the water. Approved non-metallic water distribution piping is recommended.

NOTE:

The FDA has input on dialysis unit standards, it is important to check this standard and specification before installing the unit.

APPROVED METHOD OF BACKFLOW PROTECTION

- | | |
|------------------|--|
| 1. ASME A112.1.2 | Air gap on water to each unit |
| 2. ASSE 1013 | Reduced pressure zone backflow preventer |

*Each unit needs state product approval

KITCHEN EQUIPMENT (SPECIALIZED)

SPS 382.41 - Cross-connection control for **Kitchen Equipment** is based on a low and high degree of hazard for the protection of the potable water supply.

TYPES

This category is made up of all **kitchen equipment** not listed in their own category. This category is not limited to equipment listed below. Any **kitchen equipment** can be protected and protection device selected by guidelines listed below.

Kettle Filler
Pasta Cooker
Potato Peeler
Proofer / Steamer

APPROVED METHOD OF BACKFLOW PROTECTION

- | | |
|------------------|---|
| 1. ASME A112.1.2 | Air gap – water fill above rim of equipment |
| 2. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 3. ASSE 1011 | Hose connection vacuum breaker. |
| 4. ASSE 1012 | Dual check with atmospheric vent |
| 5. ASSE 1013 | Reduced pressure backflow preventer |
| 6. ASSE 1052 | Hose connection backflow preventer |
| 7. ASSE 1056 | Spill resistant vacuum breaker |

KITCHEN EQUIPMENT PROOFERS, RETHEMALIZERS AND STEAM TABLES

SPS 382.41 - Cross-connection control for **proofers, rethermalizers and steam tables** are based on a high or low degree of hazard depending on use, for the protection of the potable water supply.

TYPES

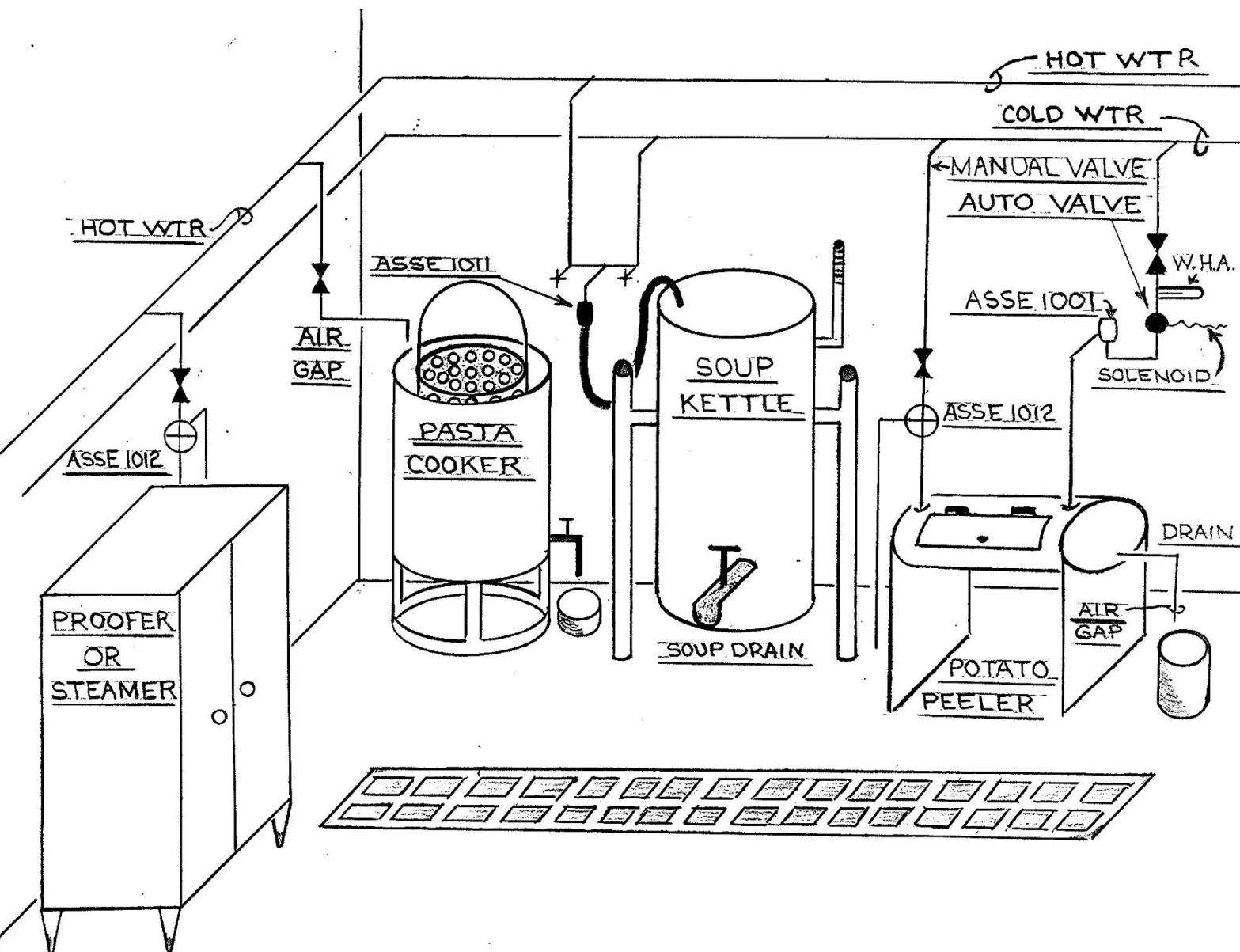
This chapter addresses backflow protection needed on equipment used primarily for heating/warming food. These types of equipment use water/steam to create heat for warming. **Proofers** use water to maintain desired humidity levels in the cooking/heating process. Most **steam tables** and some **proofers** and some **rethermalizers** have submerged inlets. This is the primary reason for a high hazard classification.

BACKFLOW PROTECTION

The water supply serving **proofers, rethermalizers and steam tables** must be protected to the highest degree to prevent food (possibly contaminated food) but more importantly cleaning chemicals from entering the water supply system.

APPROVED METHOD OF BACKFLOW PROTECTION

- | | |
|------------------|--|
| 1. ASME A112.1.2 | Air gap on water feed to unit
Air gap on any discharge (drain) pipe |
| 2. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 3. ASSE 1012 | Dual check with atmospheric vent |
| 4. ASSE 1013 | Reduced pressure back flow preventer |
| 5. ASSE 1056 | Spill resistant vacuum breaker |



LAB FAUCETS

SPS 382.41 - Cross-connection control for **laboratory faucets** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

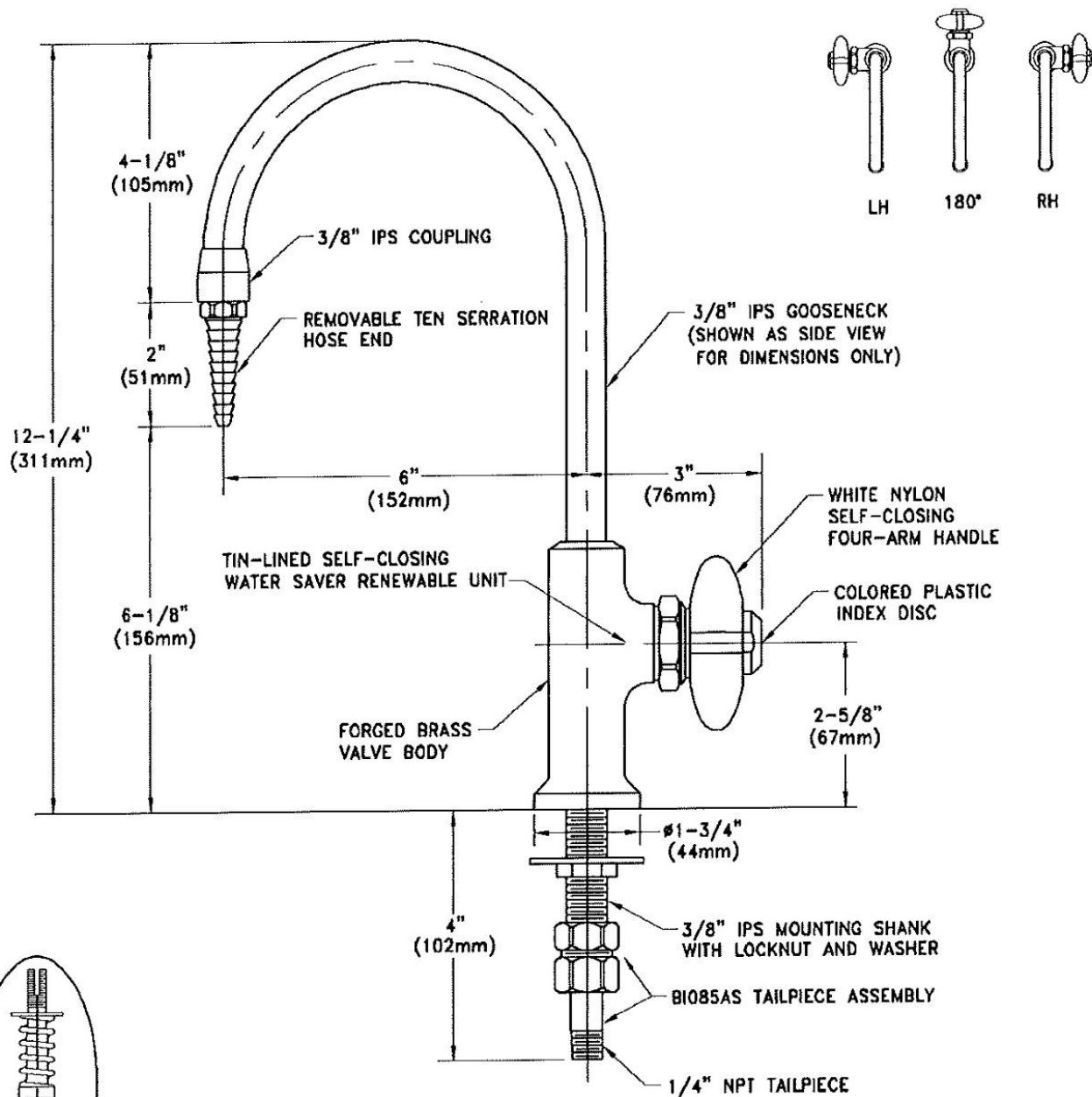
The **laboratory faucets** of concern have serrated hose adapters at end of spout. The type of faucet may be deck mounted or back mounted in counter or sink.

BACKFLOW PROTECTION

The water supply serving the **laboratory faucets** must be protected to the highest degree to prevent any contaminants that the hose may come into contact with from entering the water supply system. Faucets with atmospheric vacuum breaker built-in on spout **are not permitted**. Attached hose can be lifted higher than vacuum breaker causing discharge.

APPROVED METHOD OF BACKFLOW PROTECTION

1. ASSE 1035 Laboratory vacuum breaker (may not be used in fume hood and may not be employed in backpressure situations of more than 6ft. of water column.)

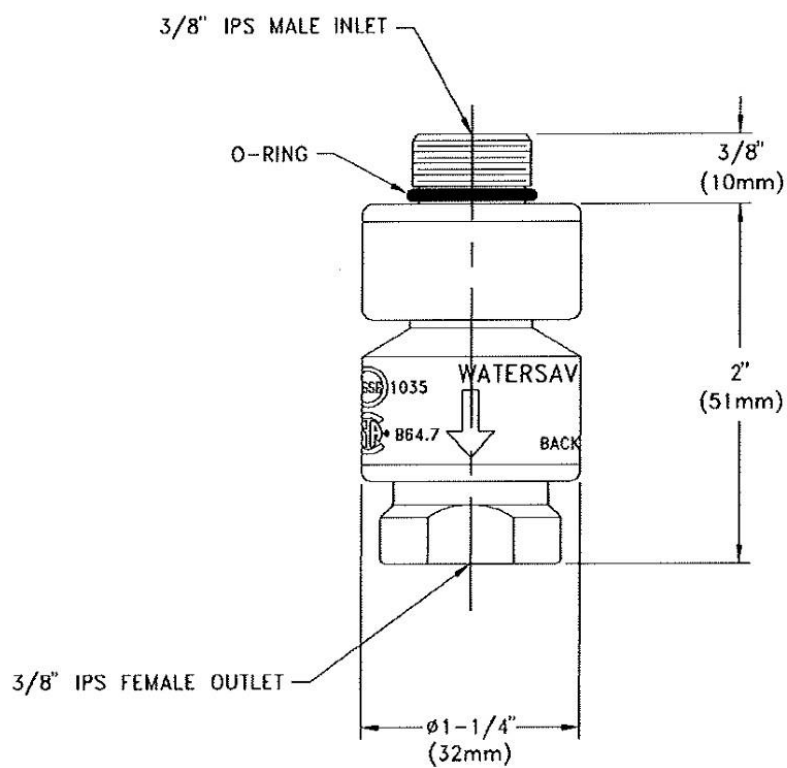


MEASUREMENTS MAY VARY $\pm 1/4"$.

NOTE:

FIXTURE HAS INTERIOR LINING OF PURE TIN.

TIN-LINED 3/8" IPS LABORATORY IN-LINE VACUUM BREAKER



NOTE:
FIXTURE HAS INTERIOR LINING OF
PURE TIN.

MEASUREMENTS MAY VARY $\pm 1/4"$.

LAB HOOD

SPS 382.41 - Cross-connection control for **lab hoods** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

Lab hoods are used for experimenting and testing in laboratories. Their primary function is to remove fumes that are created during mixing process of chemicals. Water use is limited in this process to dilution and clean up. For this reason many **lab hoods** have had the water disconnected and capped.

BACKFLOW PROTECTION

The water supply serving the **lab hood** must be protected to the highest degree of hazard to prevent chemicals and chemical fumes from entering the water supply system.

NOTE:

All backflow devices must be located outside of hood.

APPROVED METHODS OF BACKFLOW PROTECTION

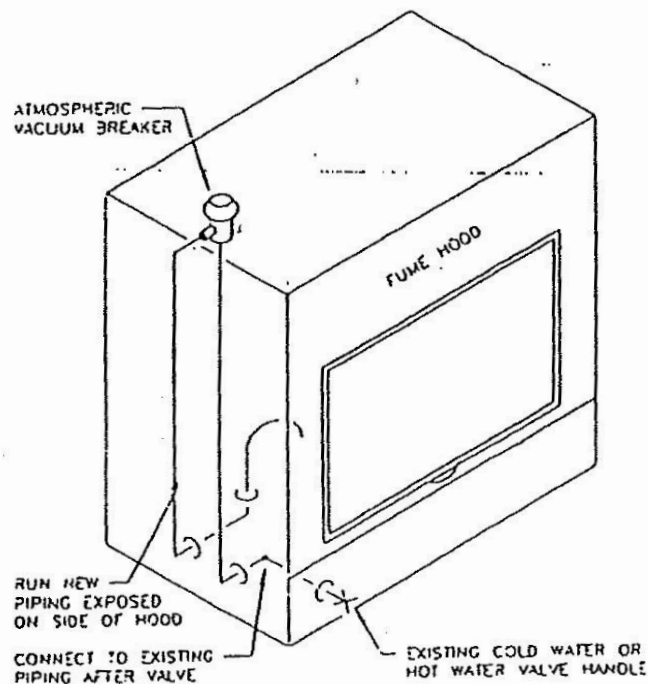
- | | |
|--------------|--|
| 1. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 2. ASSE 1013 | Reduced pressure principle backflow preventer |
| 3. ASSE 1035 | Laboratory vacuum breaker (may not be used in fume hood and may not be employed in backpressure situations of more than 6ft. of water column.) |
| 4. ASSE 1056 | Spill resistant vacuum breaker |

LAB HOODS

Cross-connection control for lab hoods is based on their high hazard for the protection of the drinking water. Lab hoods are used for tests and experiments. Water supply lines for hoods must be protected with a high hazard backflow device or assembly that is exterior to the hood to prevent backflow of toxic fumes.

The most common way is by piping a atmospheric vacuum breaker (ASSE1001) outside the cabinet of the hood. Note that many labs find water supply is not necessary and decide to discontinue piping to the hood.

In some cases a reduced pressure zone valve (ASSE1013) or a pressure vacuum breaker (ASSE1056) must be used on the water supply line.



LAUNDRY SINKS

SPS 382.41 - Cross-connection control for **laundry sinks** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

The types of **laundry sinks** are limited to wall mount, floor mount and cabinet styles. Similar to mop sinks that typically have wall mounted faucets, **laundry sinks** have attached, above the rim fillers. The high hazard is present due to hose threads on the spout of the faucet. When the faucet has an aerator, no hose thread, no additional back flow protection is required.

BACKFLOW PROTECTION

The water supply serving the **laundry sink** must be protected to the highest degree to prevent any contaminants/toxins from entering the water supply. The main concern with these fixtures is a hose attached to the spout. The other end of the hose has the possibility of being left in a drain or in a bucket of detergent. Soap dispensing systems may be present on **laundry sinks**. These units must be approved and installed properly to meet all back flow requirements.

NOTE:

If addition of vacuum breaker on spout creates less than a 1" air gap between spout and flood level rim of sink, the **laundry sink** faucet must be raised up to meet 1" minimum requirement.

APPROVED METHOD OF BACKFLOW PROTECTION

*See chapter on "Mop Sinks" for proper backflow protection requirements

MOP SINKS

SPS 382.41-Cross-connection control for **mop sinks** is based on a high degree of hazard for the protection of the potable water supply. When soap-dispensing systems are attached a high degree of hazard is observed for both the soap dispensing unit and the mop sink.

TYPES

Mop sinks are commonly used as either floor mount or wall mount (service sinks) units. Faucets serving these units can be a mixing valve in the wall or a two handle-mixing valve outside the wall. It was common for a period of time for an atmospheric vacuum breaker to be piped in above **mop sink** at a min. 7'6" above finish floor. This vacuum breaker will serve as protection for the **mop sink**. If a soap dispenser is added it would require its own backflow protection (see sketch in this chapter). A faucet with atmospheric vacuum breaker built in is not an approved faucet and would therefore require additional backflow protection.

BACKFLOW PROTECTION

The water supply serving the **mop sink** must be protected to the highest degree of hazard to prevent any toxins or contaminants from entering the water supply system. Prevention of any soaps or detergents from entering the water supply is a great concern as well as any backflow due to hoses being left in drains, buckets, etc.

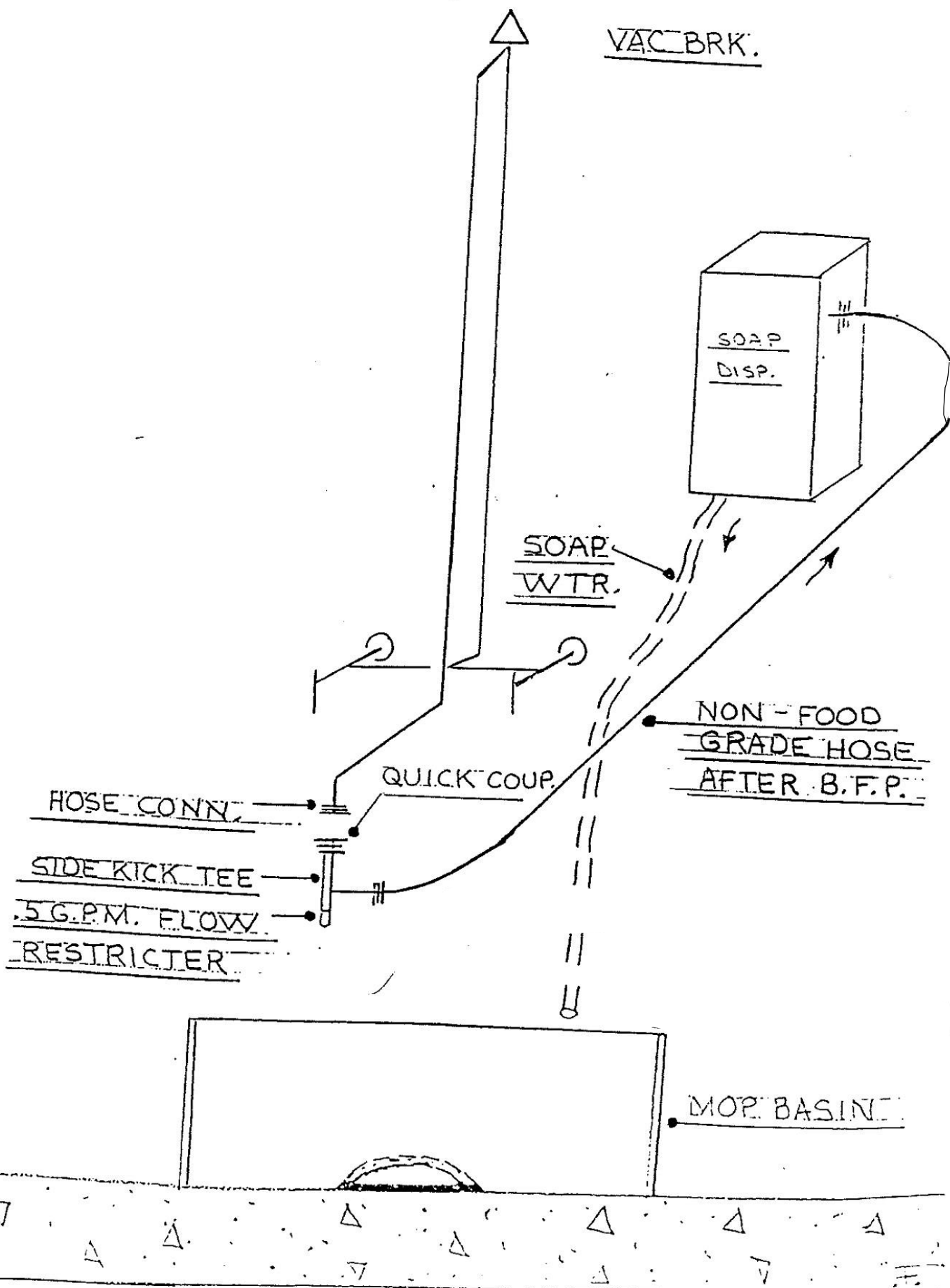
NOTE:

Each hose thread shall have backflow protection.

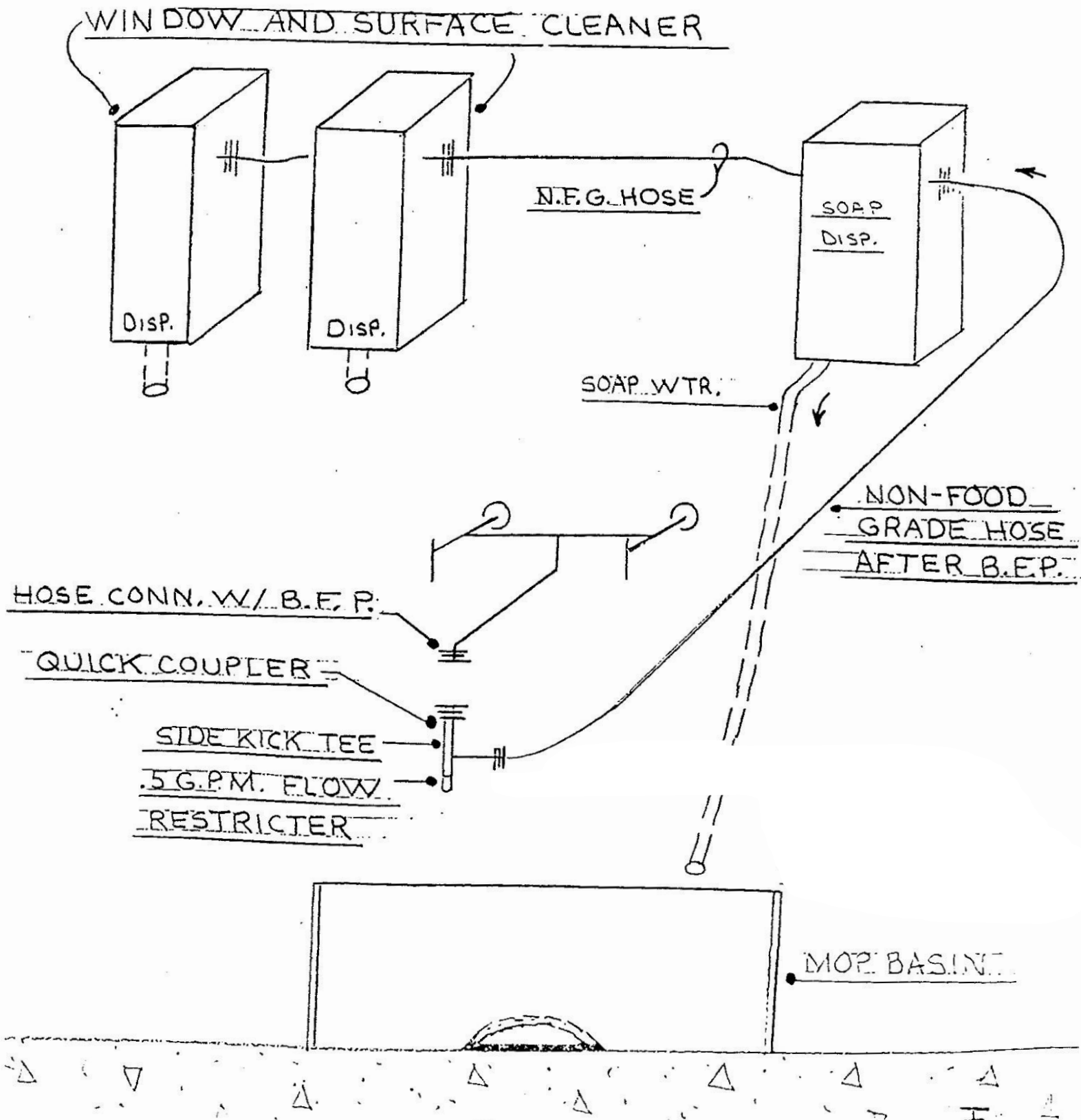
APPROVED METHOD OF BACKFLOW PROTECTION

- | | |
|-------------------|---|
| 1. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 2. ASSE 1011 | Hose connection vacuum breaker |
| 3. ASSE 1013 | Reduced pressure backflow preventer |
| 4. ASSE 1052 | Hose connection backflow preventer |
| 5. ASSE 1055 A&B. | Chemical and Soap dispensers |
| 6. ASSE 1056 | Spill resistant vacuum breaker |

MOP BASIN W/ VACUUM BREAKER



MOP BASIN W/ B.F.P. ON SPOUT



Don't get burned on a water closet

Misuse of mixing faucet for chemical dispenser

by Mike Beckwith, S&B Plumbing Products Reviewer, 608-266-8742, mbeckwith@commerce.state.wi.us

How would you like to flush a toilet that you're sitting on and get burned by hot water?

You may be asking yourself, who would pipe hot water to a water closet? Good question, but that was not the cause of this accident. The cause was the misuse of a mixing faucet and improper installation of a chemical dispenser.

The following is from an article published in the fall 1999 North American Backflow Association's *Cross Examiner*. A plumbing contractor's repairman was servicing a flushometer valve on a urinal in a large supermarket. A man in a nearby stall started to yell after he flushed the water closet he was sitting on and he was severely burned by hot water.

The store manager blamed the man's injury on the contractor.

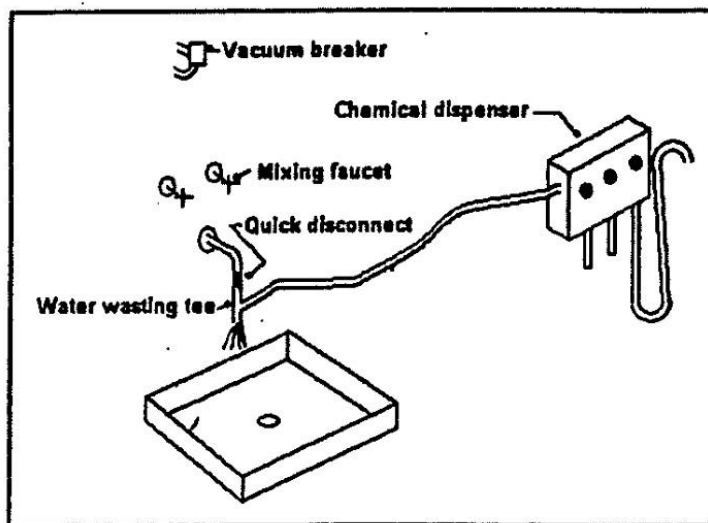
Denying any responsibility, the contractor immediately started to look for the cause of the man's burn. The repairman discovered a chemical dispenser mounted near a janitor's sink in the janitor's room near the restroom. The sink's faucet was equipped with an integral atmospheric vacuum breaker, and a 2-way valve mounted on the faucet's outlet. The dispenser was connected to one side of the 2-way valve.

The hot and cold water valves of the faucet were left full open, under the direction of the chemical dispenser salesman who advised the store manager. The repairman was told the salesman installed the 2-way valve and wanted the faucets left full open so the dispenser would be

pressurized at all times.

The contractor checked the cold water temperature in the restroom where the man was burned, and found the "cold water" to be 138°F. The contractor told the manager that the man was burned because the hot water was drawn into the cold water system and flowed to the water closet when it was flushed. The contractor told the manager that his installation was prohibited by the plumbing code and removed the 2-way valve from the faucet. He informed the manager that the dispenser required its own dedicated pressure vacuum breaker or reduced pressure principle assembly.

continued on next page



Note: Installing faucets with check valves in the water supply piping provides additional protection against cross-flow.

OVERHEAD HOSE REEL

SPS 382.41- Cross-connection control for **overhead hose reels** is based on a high degree of hazard for the protection of the potable water supply.

APPROVED METHODS OF BACKFLOW PROTECTION

- | | |
|--------------|---|
| 1. ASSE 1011 | Hose connection vacuum breaker |
| 2. ASSE 1013 | Reduced pressure principle backflow preventer |
| 3. ASSE 1052 | Hose connection backflow preventer |
| 4. ASSE 1056 | Spill resistant vacuum breaker |

POOLS

SPS 382.41- Cross-connection control for **pools** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

Pools will have a fill pipe located somewhere in the system, either at poolside or in an equipment room. Generally a fill pipe will discharge directly into the pool or into a large fill tube (ex: 4" pvc pipe). Discharge into fill tube or directly into **pool** shall be done with an air gap. If the air gap is not present additional high hazard protection is required.

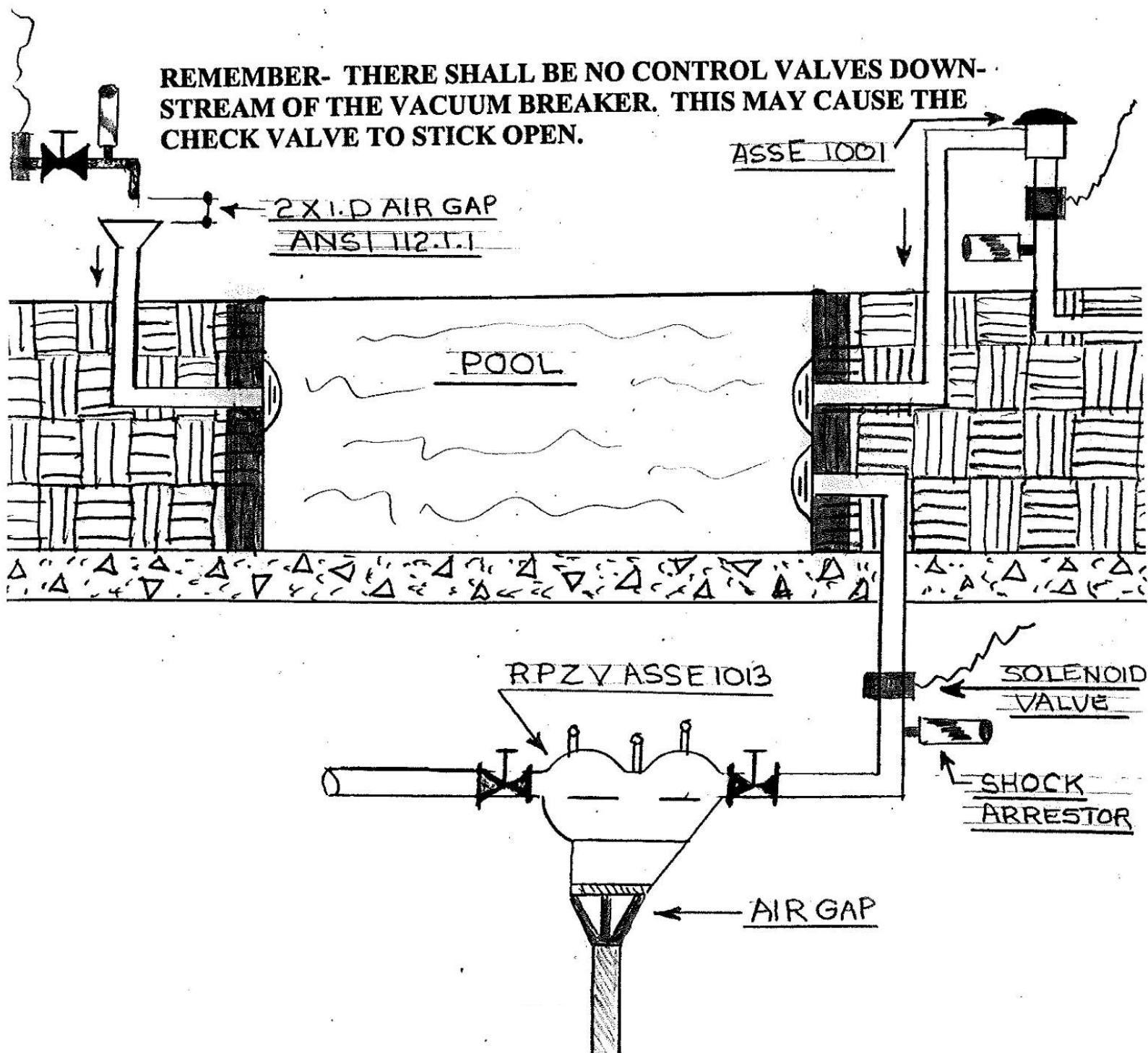
Hose bibbs are common in these areas and need ASSE 1011 protection.

APPROVED METHOD OF BACKFLOW PROTECTION

- | | |
|------------------|---|
| 1. ASME A112.1.2 | Air gap on the pool fillers |
| 2. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 3. ASSE 1013 | Reduced pressure backflow preventer |
| 4. ASSE 1020 | Pressure vacuum Breaker |
| 5. ASSE 1056 | Spill resistant vacuum breaker |

POOL FILLING:

**REMEMBER- THERE SHALL BE NO CONTROL VALVES DOWN-
STREAM OF THE VACUUM BREAKER. THIS MAY CAUSE THE
CHECK VALVE TO STICK OPEN.**



PRESSURE WASHER

SPS 382.41-Cross-connection control for **pressure washers** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

The two types of **pressure washers** are portable units and permanently installed fixtures. The portable unit is generally connected to a hose faucet when needed. The hose faucet is turned on when unit is being used and shut off when not in use. A hose connection vacuum breaker (ASSE 1011) protects this application. By rule this vacuum breaker cannot be subject to pressure more than 12 continuous hours. Permanent installations will require (ASSE 1013) reduced pressure principle backflow preventer or (ASSE 1056) spill resistant vacuum breaker.

APPROVED METHODS OF BACKFLOW PROTECTION

- | | |
|------------------|---|
| 1. ASME A112.1.2 | Air gap |
| 2. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 3. ASSE 1011 | Hose connection vacuum breaker |
| 4. ASSE 1013 | Reduced pressure principle backflow preventer |
| 5. ASSE 1052 | Hose connection backflow preventer |
| 6. ASSE 1056 | Spill resistant vacuum breaker |

PULPER - FOOD WASTE

SPS 382.41 - Cross-connection control for a **food waste pulper** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

The common types of **food waste pulpers** are reclaim waste units and units that discharge into disposal system. The main purpose of **food waste pulpers** is to reduce waste before termination point.

BACKFLOW PROTECTION

The water supply serving the **food waste pulper** must be protected to the highest degree to prevent any food waste contaminants from entering the water supply system. Any hose connections in or around **food waste pulpers** must be separately protected.

NOTE:

Check for factory installed backflow protection.

APPROVED METHOD OF BACKFLOW PROTECTION

- | | |
|--------------|---|
| 1. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 2. ASSE 1013 | Reduced pressure backflow preventer |
| 3. ASSE 1056 | Spill resistant vacuum breaker |

SOAP PROPORTIONERS

SPS 382.41 - Cross connection control for **soap proportioners** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

Soap proportioners are attached to the spout of faucets in commercial kitchens. The purpose is to dispense soap w/ water in controlled portions. These units are connected to a faucet spout in place of the aerator with an approved tee. A hose connected to the equipment manufacturers' tee is run to the proportioning equipment and continues to the soap supply bottle.

BACKFLOW PROTECTION

The water supply serving soap proportioners must be protected to the highest degree to prevent any contaminants (detergent) from entering the water supply.

APPROVED METHODS OF BACKFLOW PROTECTION

- | | |
|-------------------|-------------------------------------|
| 1. ASSE 1013 | Reduced pressure backflow preventer |
| 2. ASSE 1055 A&B. | Chemical and Soap dispensers |
| 3. ASSE 1056 | Spill resistant vacuum breaker |

STEAM ROOM GENERATORS

SPS 382.41- Cross-connection control for **Steam Room Generators** is based on a low degree or high degree of hazard for the protection of the potable water supply.

TYPES

HIGH HAZARD

Steam Generators with relief valves over 15 PSIG and/or with chemicals.

LOW HAZARD

Steam Generators with relief valves with 15 PSIG or less and without chemicals.

APPROVED METHODS OF BACKFLOW PROTECTION

- | | |
|--------------|---|
| 1. ASSE 1012 | Dual check with atmospheric vent (Low Hazard) |
| 2. ASSE 1013 | Reduced Pressure Backflow Preventer (High Hazard) |

STRAHMAN TYPE VALVES (MIXING VALVE)

SPS 382.41 - Cross-connection control for **Strahman type valves** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

Strahman valves come in variations for hose station mixing valves.

BACKFLOW PROTECTION

The water supply serving **Strahman type valves** must be protected to the highest degree to prevent any toxins from entering the water supply. The uncertainty and concern of where the end of the hose could be left is what creates a high hazard situation.

NOTE:

Non-continuous pressure standards must be met

APPROVED METHOD OF BACKFLOW PROTECTION

- | | |
|--------------|---|
| 1. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 2. ASSE 1011 | Hose connection vacuum breaker |
| 3. ASSE 1013 | Reduced pressure backflow preventer |
| 4. ASSE 1020 | Pressure vacuum breaker |
| 5. ASSE 1052 | Hose connection backflow preventer |
| 6. ASSE 1056 | Spill resistant vacuum breaker |

SURGICAL WASTE UNIT

SPS 382.41 - Cross-connection control for **surgical waste units** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

Two types of **surgical waste units**, discussed in this chapter, are stationary units and docking systems. The stationary units are permanently installed in the surgical area. These units are piped in place with hoses and apparatus extending to the surgical area. All filtering, flushing and containment is done in this unit. The docking units have flexibility and convenience in their design. These units have two components, the docking station and the rover unit. The rover is the part of the equipment that is used during medical procedure. Upon completion of procedure, the rover is returned to docking station. When the rover is properly connected to the docking station, flushing and disposal of fluids will occur.

BACKFLOW PROTECTION

The water supply serving the **surgical waste unit** must be protected to the highest degree to prevent human body fluids and surgical medicines as well as other toxins from entering the water supply system.

APPROVED METHOD OF BACKFLOW PROTECTION

1. ASSE 1013 Reduced pressure backflow preventer





URINALS

SPS 382.41 - Cross-connection control for **urinals** is based on a **high** degree of hazard for the protection of the potable water supply.

TYPES

There are flush valve and tank type **urinals**.

BACKFLOW PROTECTION

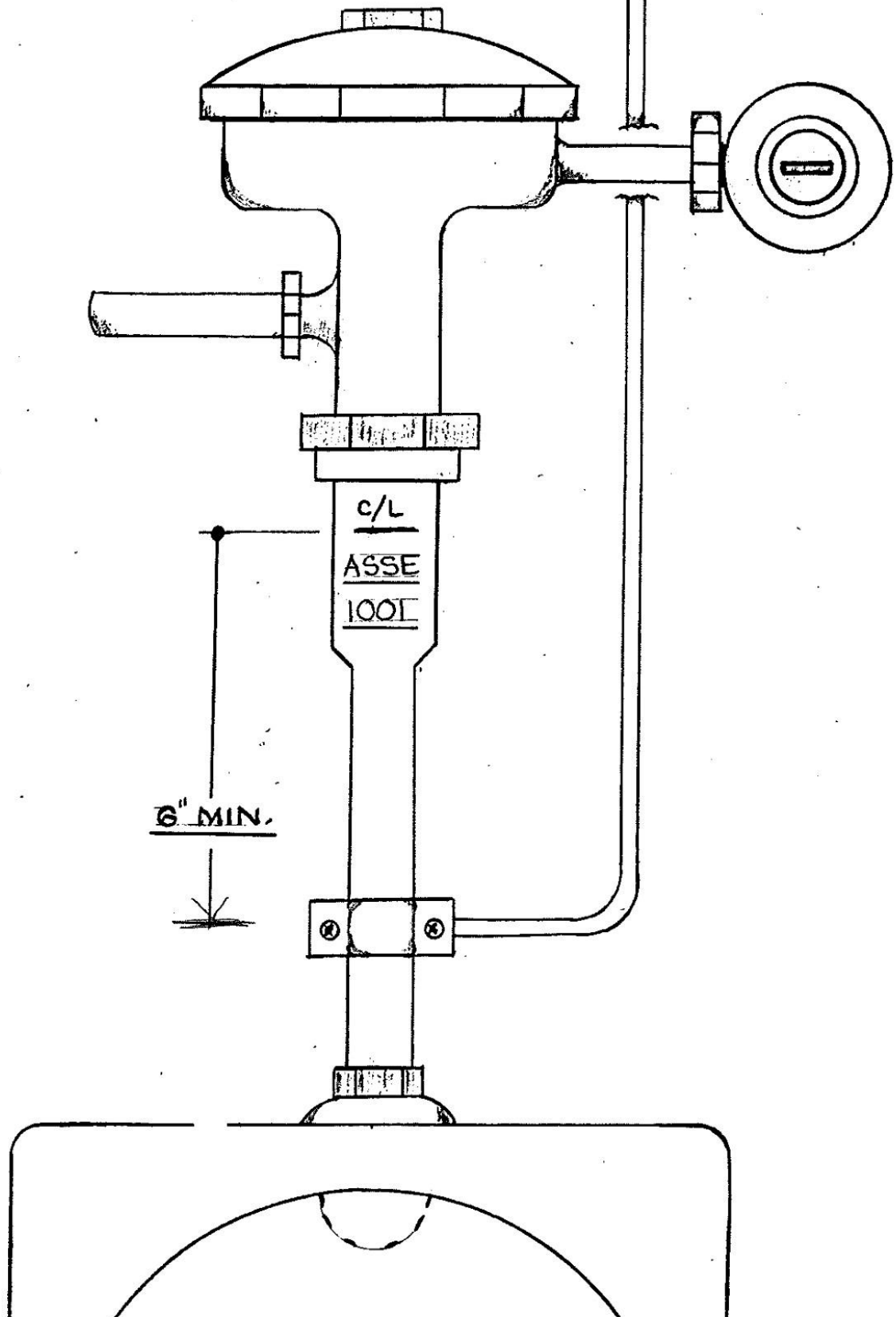
The tank type must have an air gap between the water supply and the tank. The flush valve type must have a vacuum breaker between the flush valve and the urinal.

APPROVED METHOD OF BACKFLOW PROTECTION

- | | |
|------------------|---|
| 1. ASME A112.1.2 | Air gap |
| 2. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 3. ASSE 1037 | Approved flush device Flush valve |

AUTOMATIC FLUSH
VALVE DRIP SYSTEM
CLEANER

D.N.S.
SOAP
CO.



VENDING MACHINES

SPS 382.41 - Cross-connection control for a **vending machine** is based on a low and high degree of hazard for the protection of the potable water supply.

NOTE:

A low degree of hazard is typical for **vending machines** and beverage dispensers in general. What prompts a high degree of hazard in some **vending machines** is a hose and spray, built into the machine.

TYPES

The most common type of **vending machines**, with a water connection, are hot chocolate, coffee and cappuccino dispensers. Any other **vending machine**, connected to the water system, will need to be looked at for proper backflow protection.

BACKFLOW PROTECTION

The water supply serving a **vending machine** must be protected to the highest degree to prevent any contaminants (coffee products) or toxins (cleaning chemicals) from entering the water supply. A **vending machine** that does not have a hose and spray may be considered low hazard. This will be determined by the way the water enters the coffee making process. In some **vending machines** you will find an air gap or some form of back flow protection.

APPROVED METHOD OF BACKFLOW PROTECTION

Low Hazard

- | | |
|--------------|-------------------------------------|
| 1. ASSE 1012 | Dual check with atmospheric vent |
| 2. ASSE 1022 | Dual check valve w/atmospheric vent |

High Hazard

- | | |
|------------------|-------------------------------------|
| 1. ASME A112.1.2 | Air gap on potable water line |
| 2. ASSE 1011 | Hose connection vacuum breaker |
| 3. ASSE 1013 | Reduced pressure backflow preventer |
| 4. ASSE 1052 | Hose connection backflow preventer |

WATER CLOSET

SPS 382.41 - Cross-connection control for **water closets** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

Water closets flush in three ways; tank type (ballcock), tank type (power or assisted flush) & flush valve.

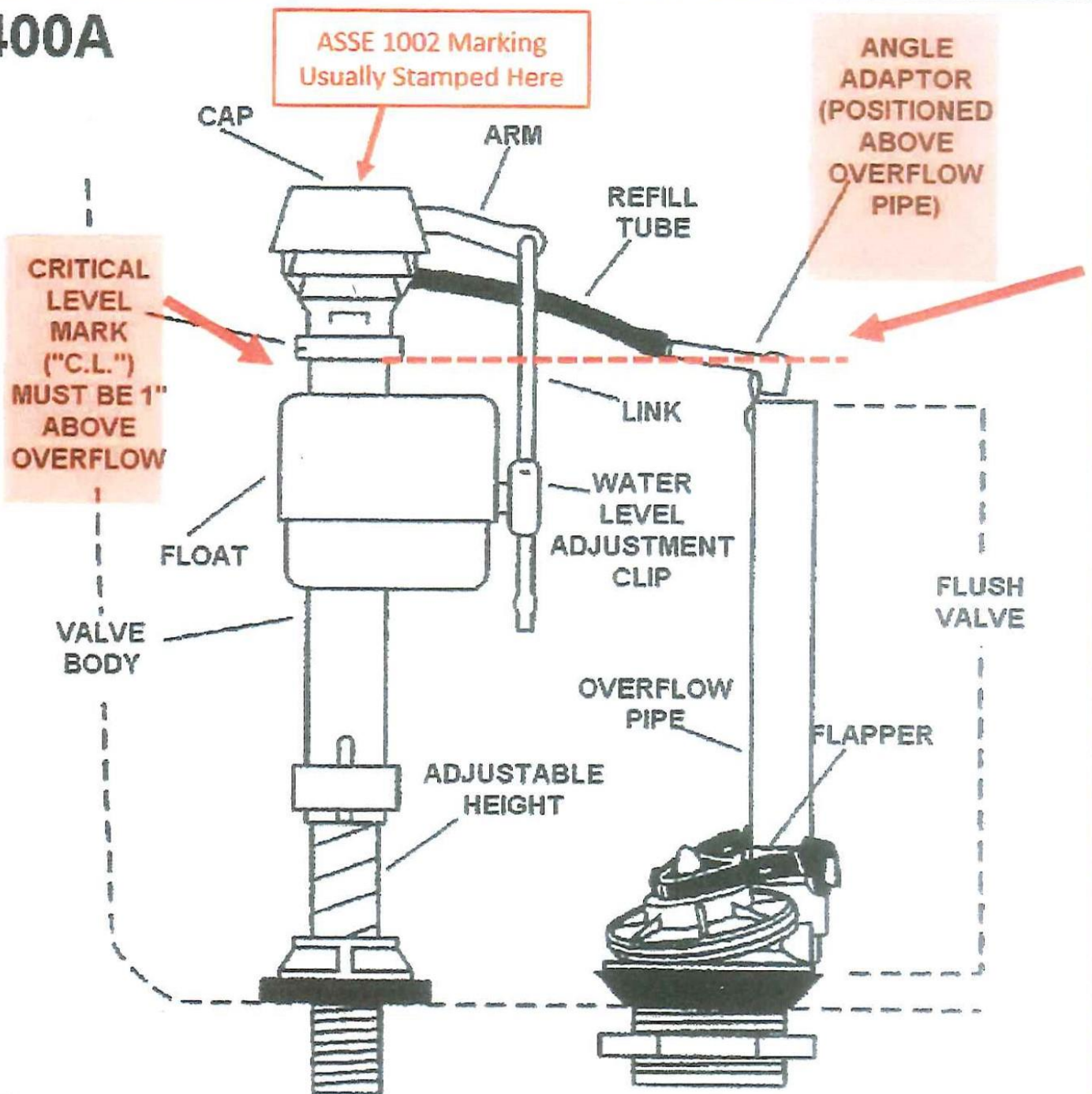
BACKFLOW PROTECTION

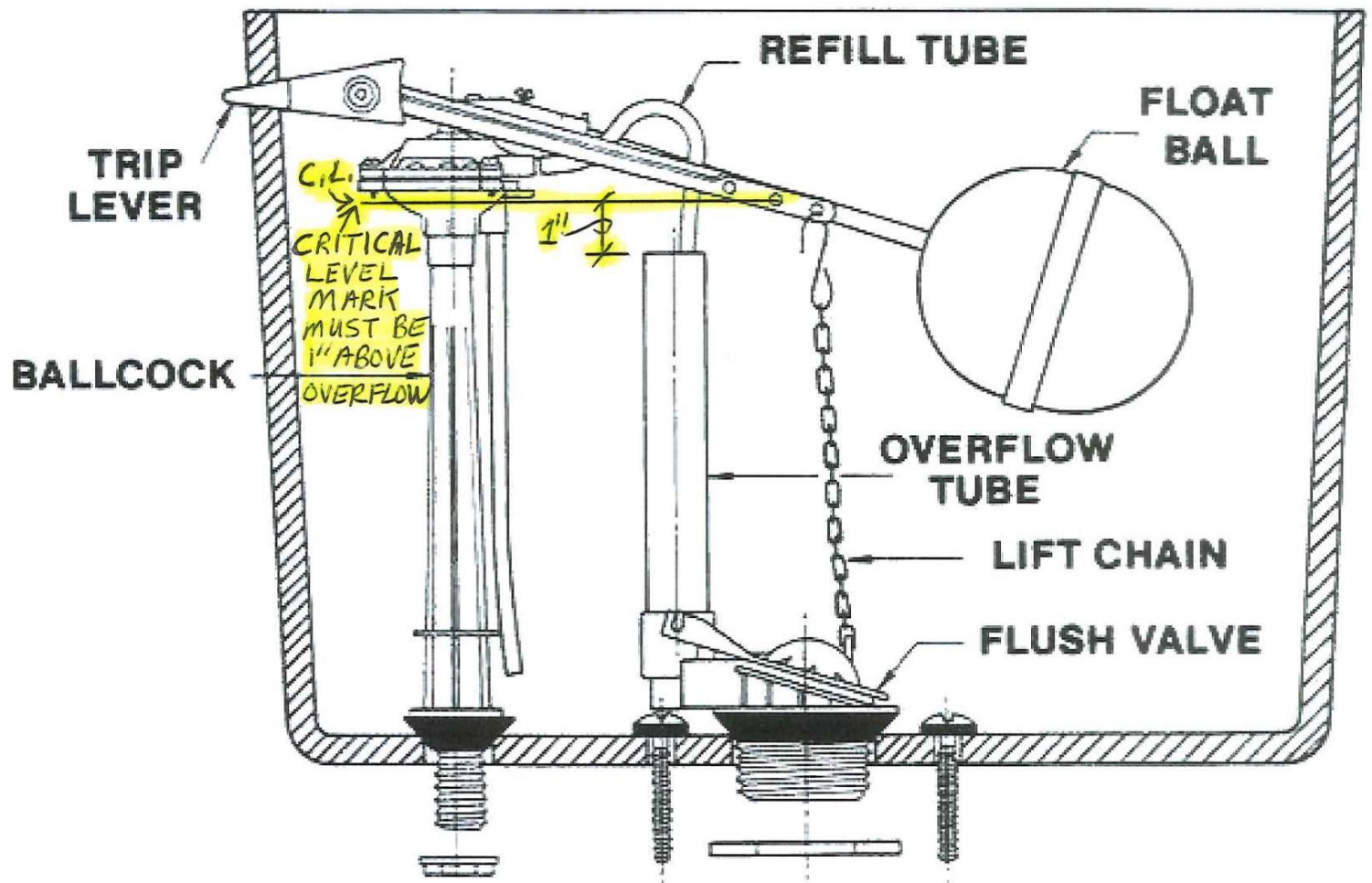
Follow lists of approved products for ballcocks & flush valves. In addition to approved products, ballcock refill tube must be higher than tank overflow and flush valves must have vacuum breaker between valve & **water closet**.

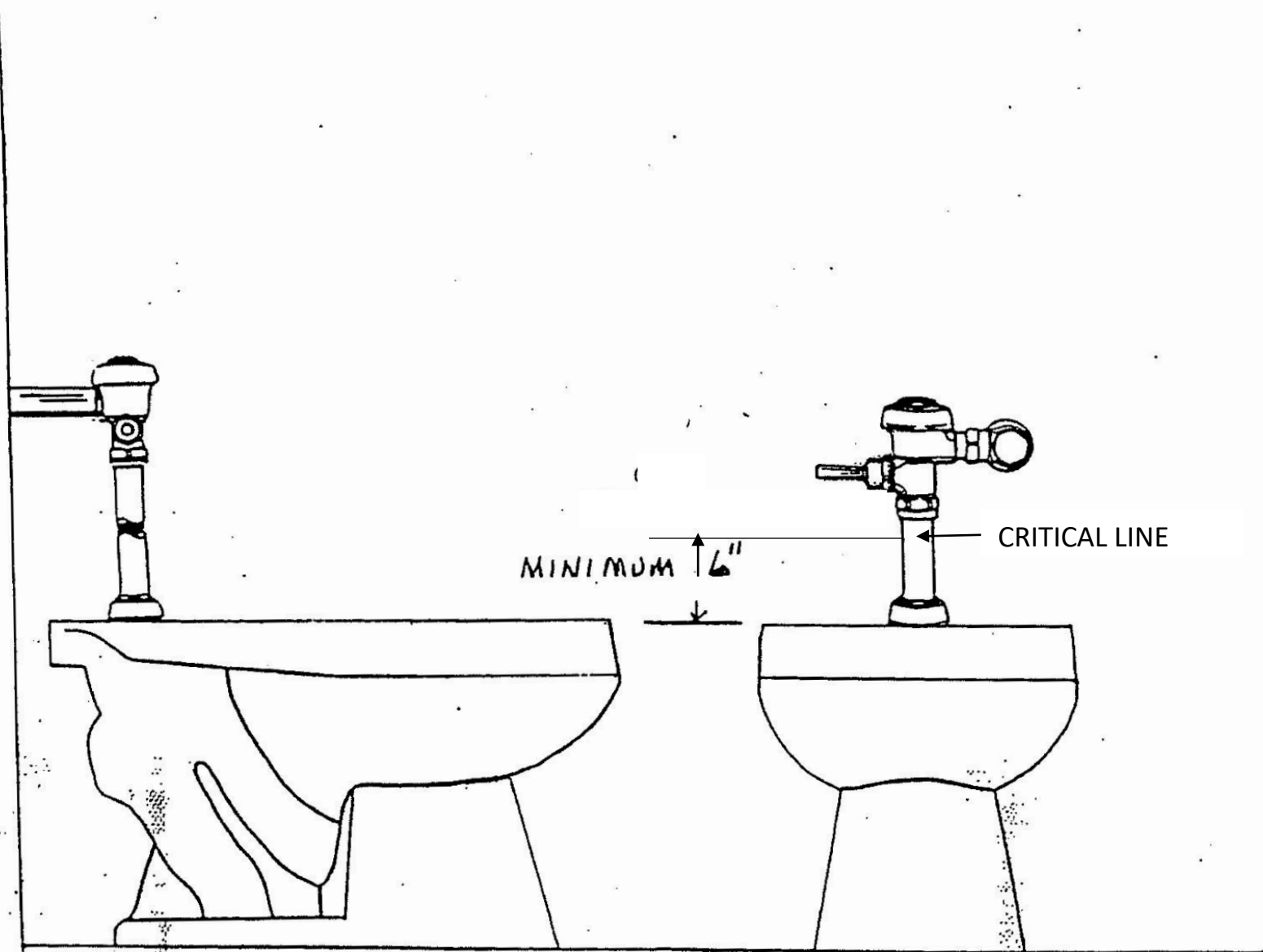
APPROVED METHOD OF BACKFLOW PROTECTION

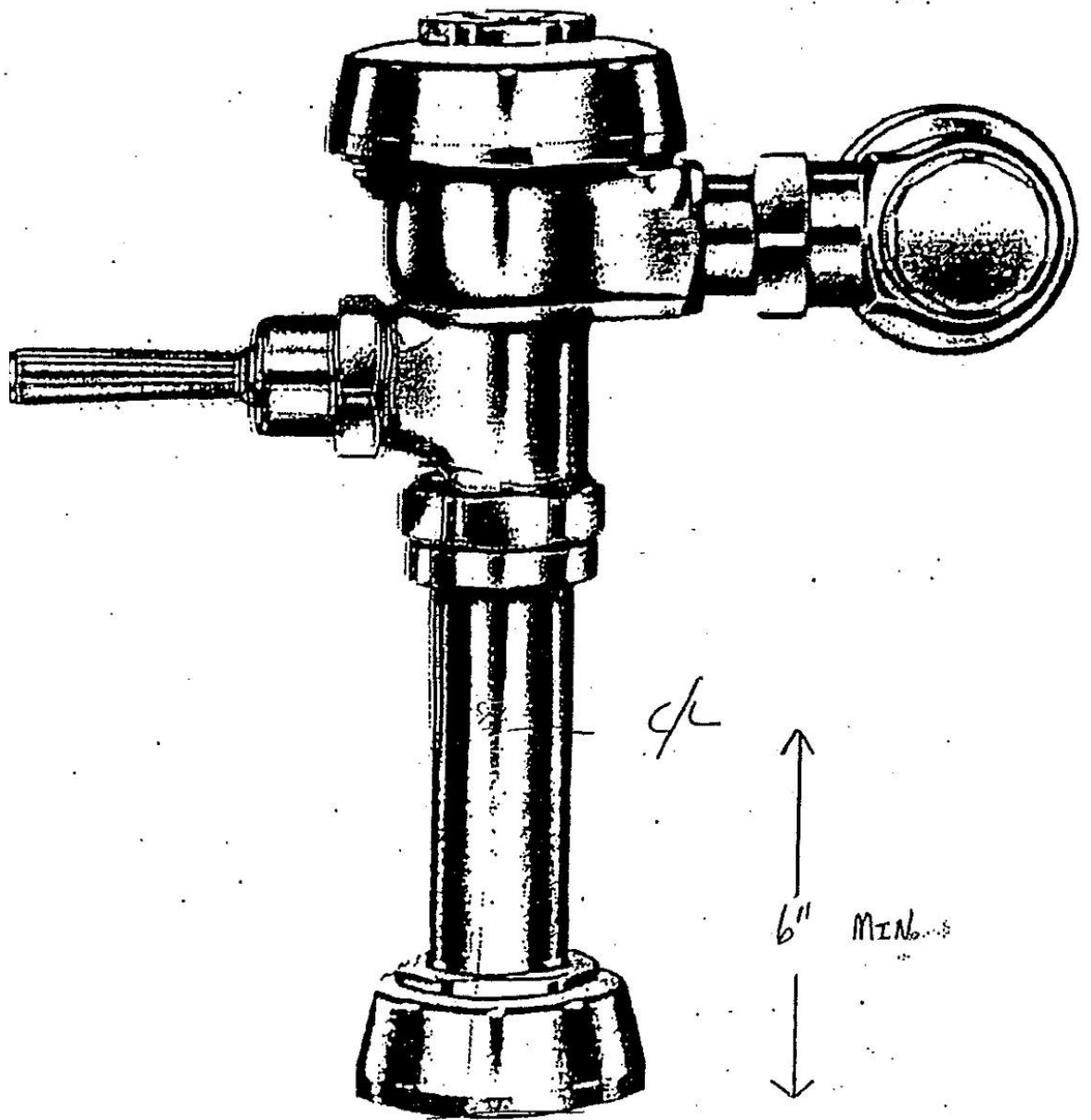
- | | |
|--------------|---|
| 1. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 2. ASSE 1002 | Approved ballcocks - Tank type |
| 3. ASSE 1037 | Approved flush device Flush valve |

400A









WATER CLOSET SEATS- WATER SUPPLIED

SPS 382.41 - Cross-connection control for **water supplied toilet seats** is based on a **high** degree of hazard for the protection of the potable water supply.

TYPES

High Hazard

APPROVED METHOD OF BACKFLOW PROTECTION

- | | |
|--------------|---|
| 1. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 2. ASSE 1013 | Reduced pressure backflow protector |
| 3. ASSE 1056 | Spill resistant vacuum breaker |

WATER CONDITIONING AND SOFTENING

SPS 382.41 - Cross-connection control for **water conditioning & softening** is based on a low degree of hazard for the protection of the potable water supply.

NOTE:

The conditioning equipment is low hazard, the type of backflow protection is decided by the equipment (fixtures) being served after the water-conditioning device.

TYPE

Types of equipment include softeners, filters and treatment systems. All devices shall discharge w/air gap and have a valve by-pass.

BACKFLOW PROTECTION

The type of backflow protection and location of backflow device is determined by the equipment or fixture being served by treated water.

APPROVED METHOD OF BACKFLOW PROTECTION

Backflow device to be selected to fit end use. The highest level of protection is:

1. ASME A112.1.2 Air Gap

Vacuum breaker tees shall be assembled such that:

1. The bottom of the horizontal portion of the tee is installed at least one inch above the flood level rim of the receptor;

2. The inside diameter of the tee is equal to or greater than the inside diameter of the drain piping from the water treatment device;

3. The tee is installed in such a position that the discharge will not create a nuisance;

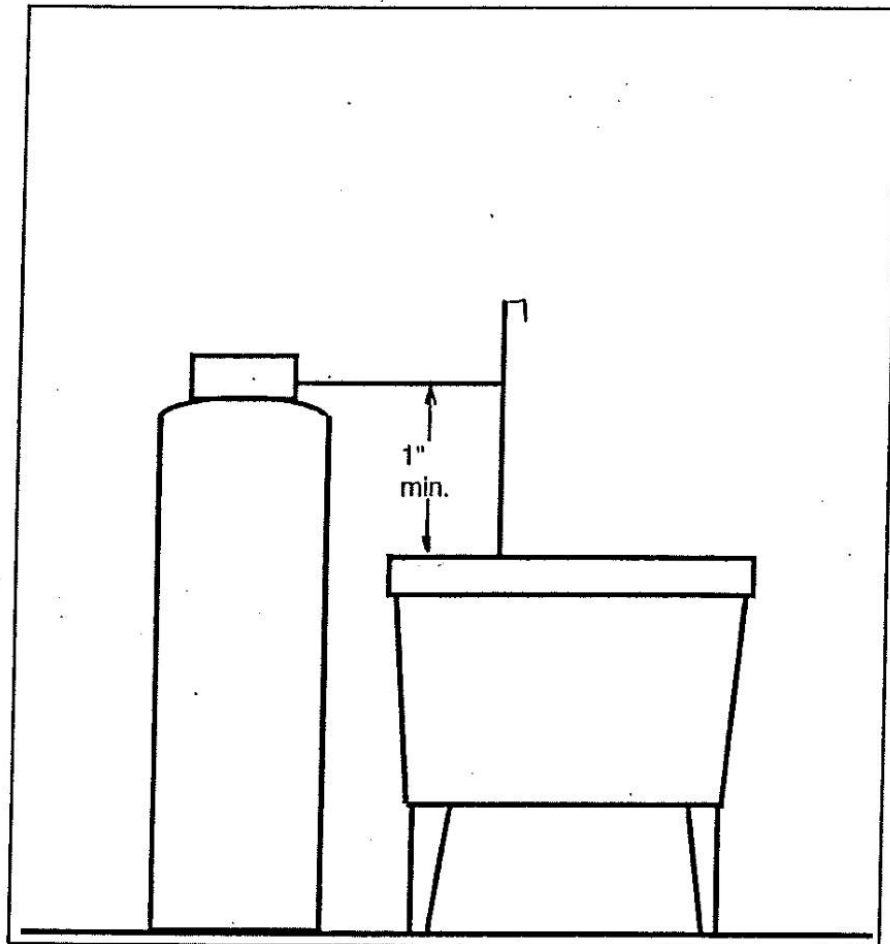
4. The piping upstream of the tee is of a type suitable for water distribution

5. The vent portion of the tee is equal to or greater than the inside diameter of the drain piping from the water treatment device; and

6. The vent port of the tee is:

a. Positioned away from areas where toxic gases and fumes may accumulate; and

b. Constructed to protect the port from falling debris.



RO SYSTEM INSTALLATION DIAGRAM

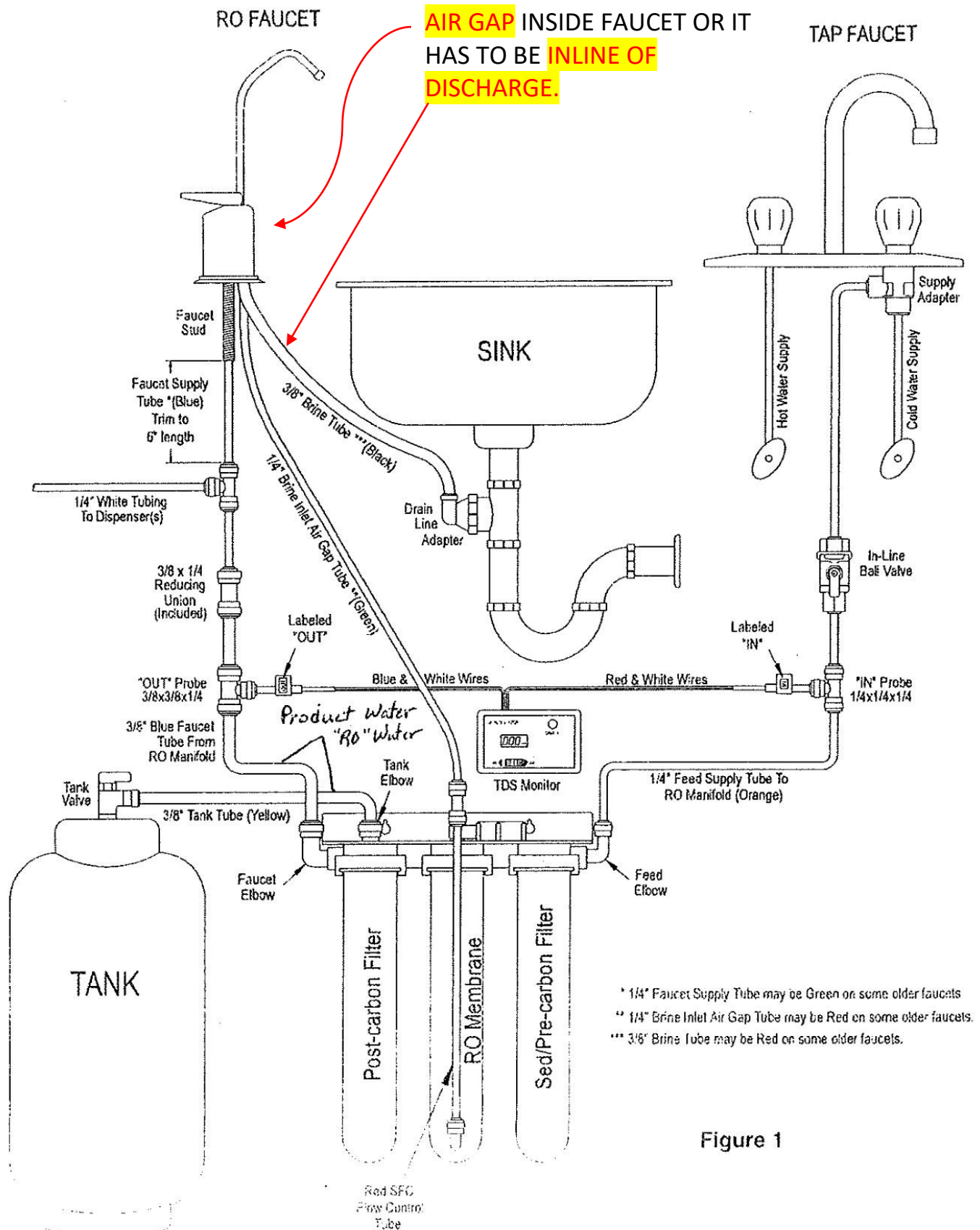


Figure 1

WATER HEATER (DUAL USE)

SPS 382.41 - Cross-connection control for **Dual Use Water Heaters** is based on a low and **high** degree of hazard for the protection of the potable water supply. These units must be listed for Dual Use.

TYPES

Dual use Water Heaters are typically used for heating both domestic hot water and heating water for building heat. The low or high degree of hazard is determined by the use of chemicals in heating system. With chemicals and high hazard classification, the water line feeding the heating chamber (closed loop) must have an RP valve as well as double wall construction of inner tank to protect against backflow into the water distribution system. This will protect domestic water from chemicals inside the tank. High hazard must also be adhered to if relief valve on heating chamber is rated higher than 30 psi.

NOTE:

All domestic water piping and piping to backflow protectors must conform to State standards for water distribution piping material.

BACKFLOW PROTECTION

382.41 (3) (b) 4. d. - A high hazard cross connection situation shall be considered to exist at a chemical pot-feeder or automatic chemical feeder installed to serve a boiler, cooling tower or chilled water system.

382.41 (3) (d) **Prohibitions.** The use of a toxic solution, as a heat transfer fluid, in single-wall heat exchanger for potable water is prohibited.

APPROVED METHOD OF BACKFLOW PROTECTION

Low Hazard

1. ASSE 1012 Dual check with atmospheric vent

High Hazard

2. ASSE 1013 Reduced pressure backflow preventer and double wall inner tank-in addition to the “High Hazard “device when chemicals are used.

WATER POWERED SUMP PUMPS

SPS 382.41 - Cross-connection control for **water powered sump pumps** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

There are several manufactures of **water powered sump pumps**. These units are piped in-line and rely on house pressure to assist in creating a suction to create discharge.

BACKFLOW PROTECTION

The water supply serving the **water powered sump pumps** must be protected at a high degree of hazard to prevent sump water from entering the water supply system. These devices usually have built-in backflow protection. The State **does not** recognize factory installed backflow protection on these devices.

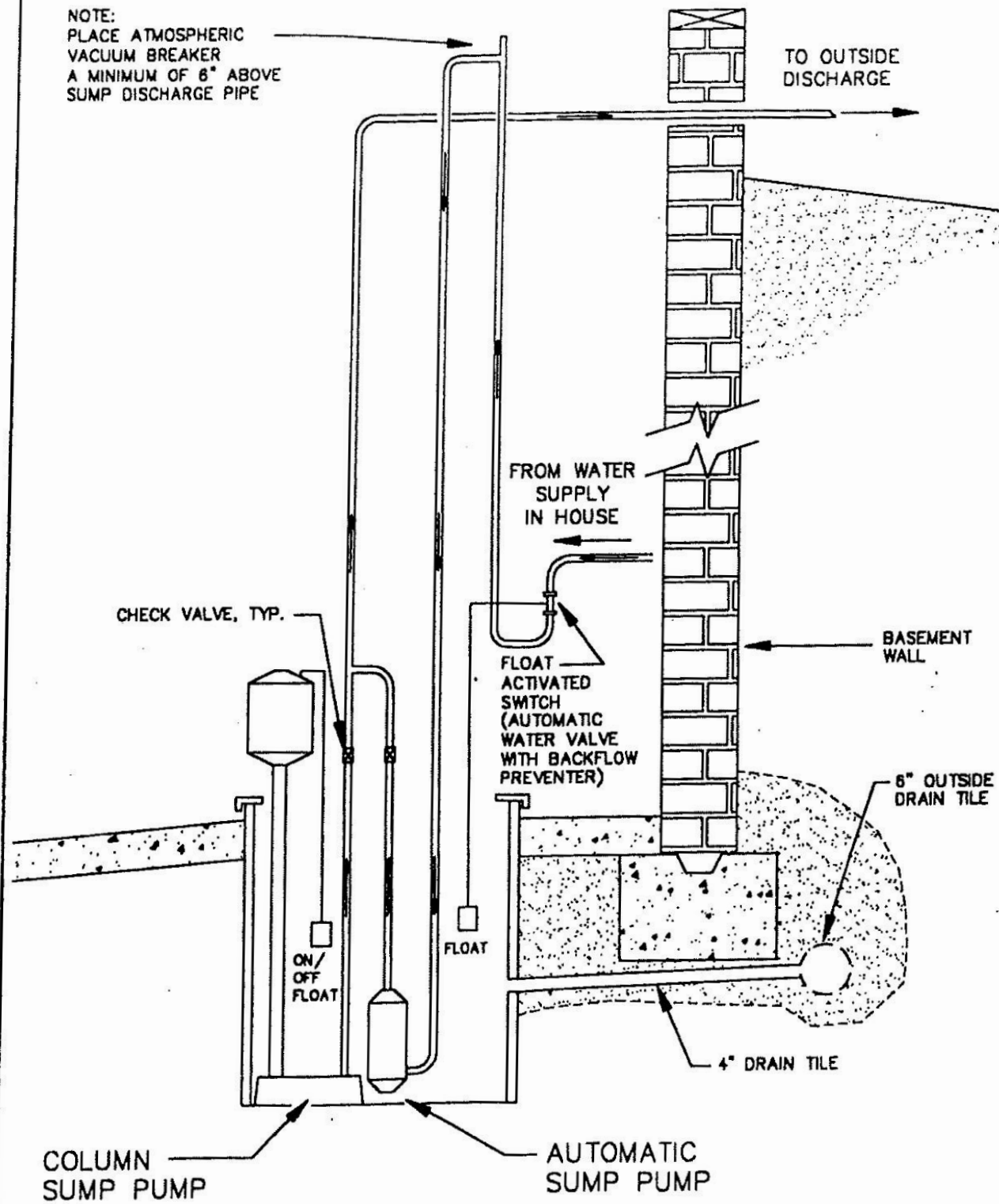
APPROVED METHOD OF BACKFLOW PROTECTION

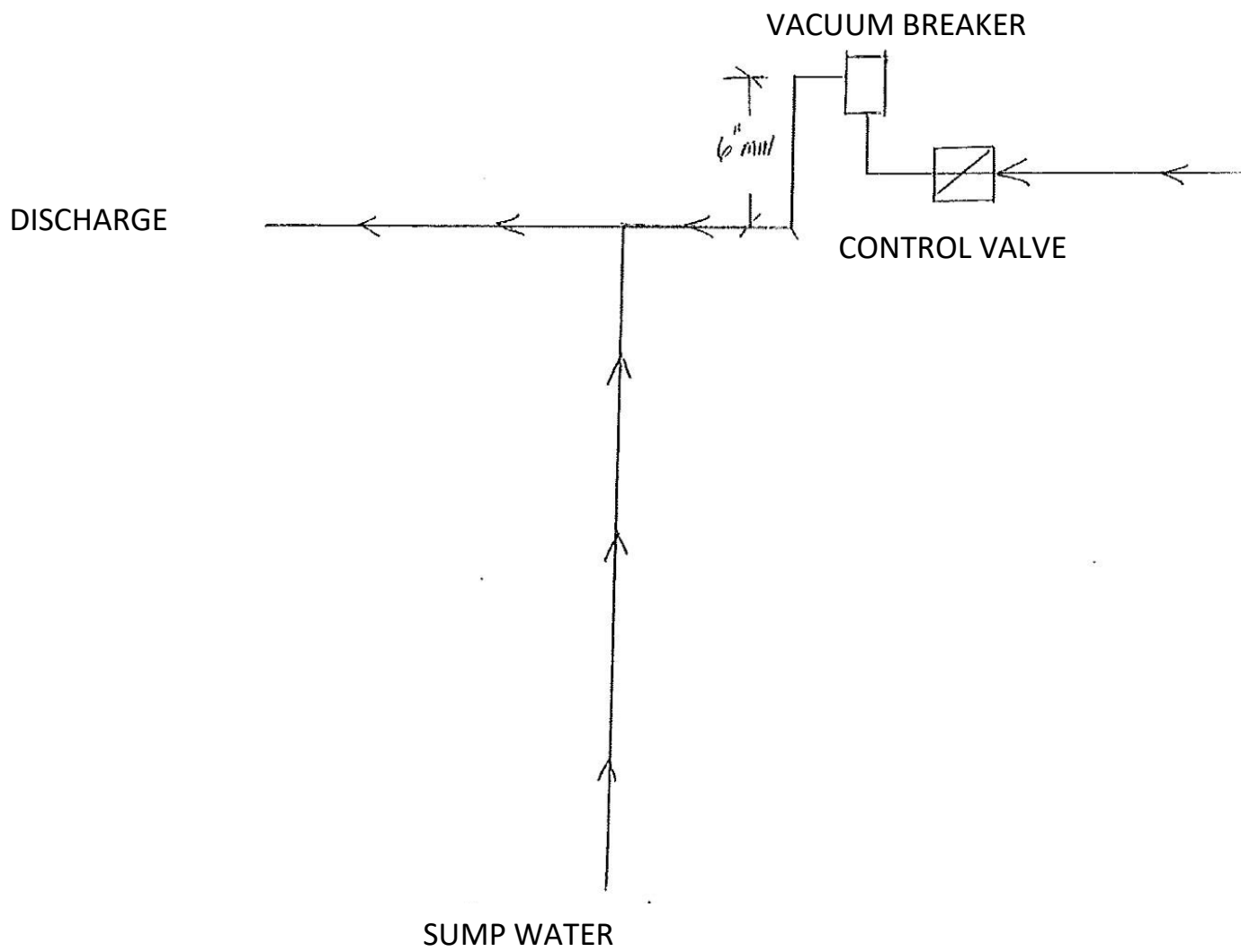
- | | |
|--------------|---|
| 1. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 2. ASSE 1013 | Reduced pressure backflow preventer |
| 3. ASSE 1056 | Spill resistant backflow preventer |

NOTE:

When the discharge pipe is directly connected, an ASSE 1013 is required. The atmospheric vacuum breaker must be installed 6" higher than the open discharge point of the system.

NOTE:
PLACE ATMOSPHERIC
VACUUM BREAKER
A MINIMUM OF 6" ABOVE
SUMP DISCHARGE PIPE





WELDER – WATER COOLED TIG TORCH

SPS 382.41 - Cross-connection control for **Tig Welder** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

Public water cooled (older)

Self-contained cooled (newer)

BACKFLOW PROTECTION

The water supply serving the water-cooled **Tig Welder** must be protected to the **highest degree** to prevent gases and contaminants from the welding process to enter water supply systems.

APPROVED METHOD OF BACKFLOW PROTECTION

- | | |
|--------------|---|
| 1. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 2. ASSE 1013 | Reduced pressure backflow preventer |
| 3. ASSE 1056 | Spill resistant vacuum breaker |

WOK AND COOKING SURFACES

SPS 382.41 Cross-connection control for **wok and cooking surfaces** is based on a high degree of hazard for the protection of the potable water supply.

TYPES

The types of **woks and cooking surfaces** can be split into a few categories. A pot filler located on the back of a range typically handles water serving woks. This is a faucet that is high enough to fill pots and maintain an air gap. Water serving **cooking surfaces** can vary in design of ranges. These ranges typically have front, rear or side gutters to aid in cleaning **cooking surfaces**. In addition, ranges may have a waterfall backsplash. This feature is used to cool down **cooking surface** as well as aid in cleaning the unit.

BACKFLOW PROTECTION

The water supply serving the **wok and cooking surfaces** must be protected to the highest degree to prevent any contaminants/toxins from entering the water supply. The use of de-greasing chemicals and surface cleaners are the reason for high hazard protection. The arrangement of nozzles, sprayers and fill ports on a range will determine the type of back flow protection required.

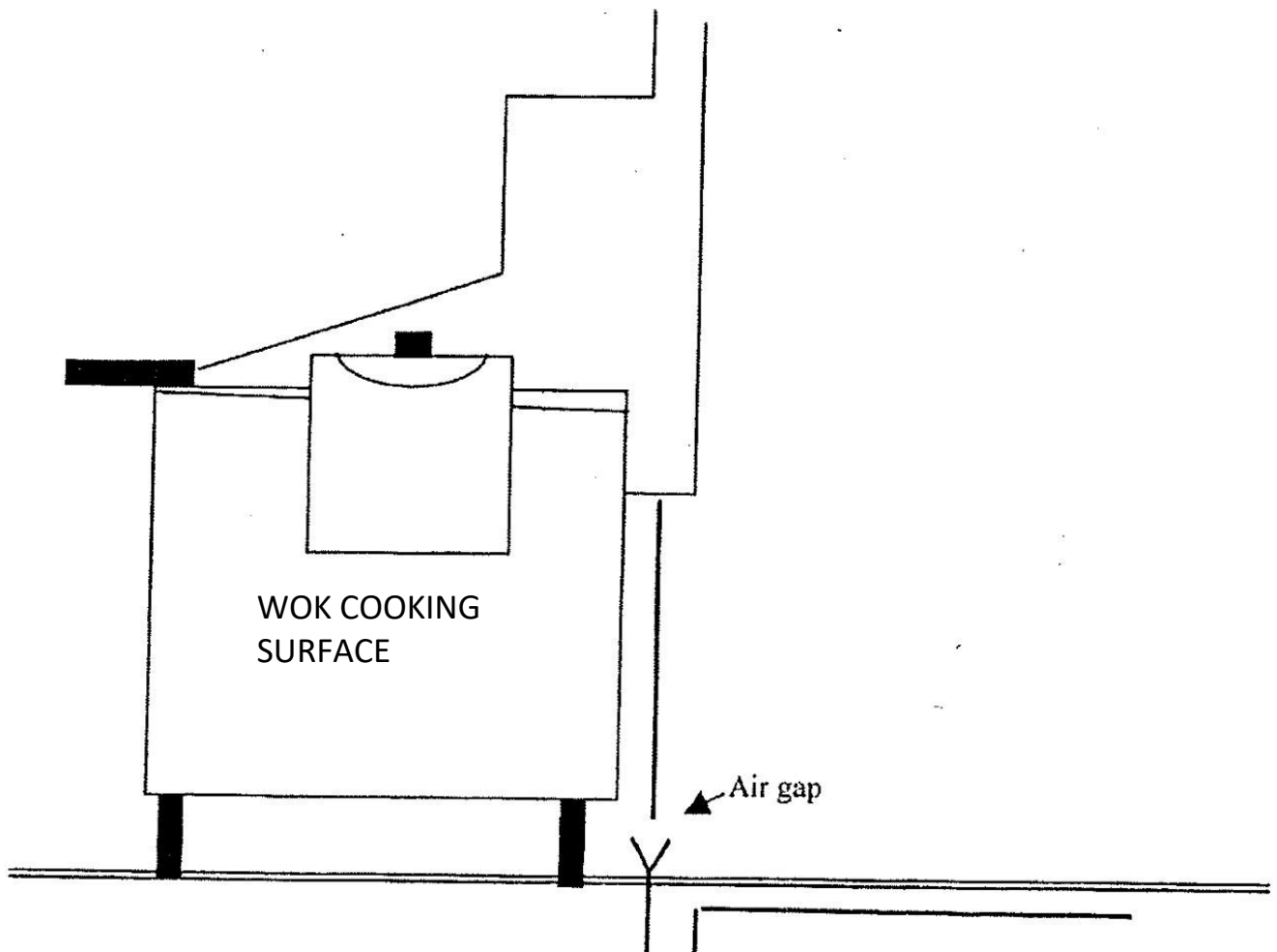
NOTE:

The drain on a **wok and cooking surface** must discharge to a grease trap. This drain must flow to a receptor and have an air gap at point of discharge into receptor.

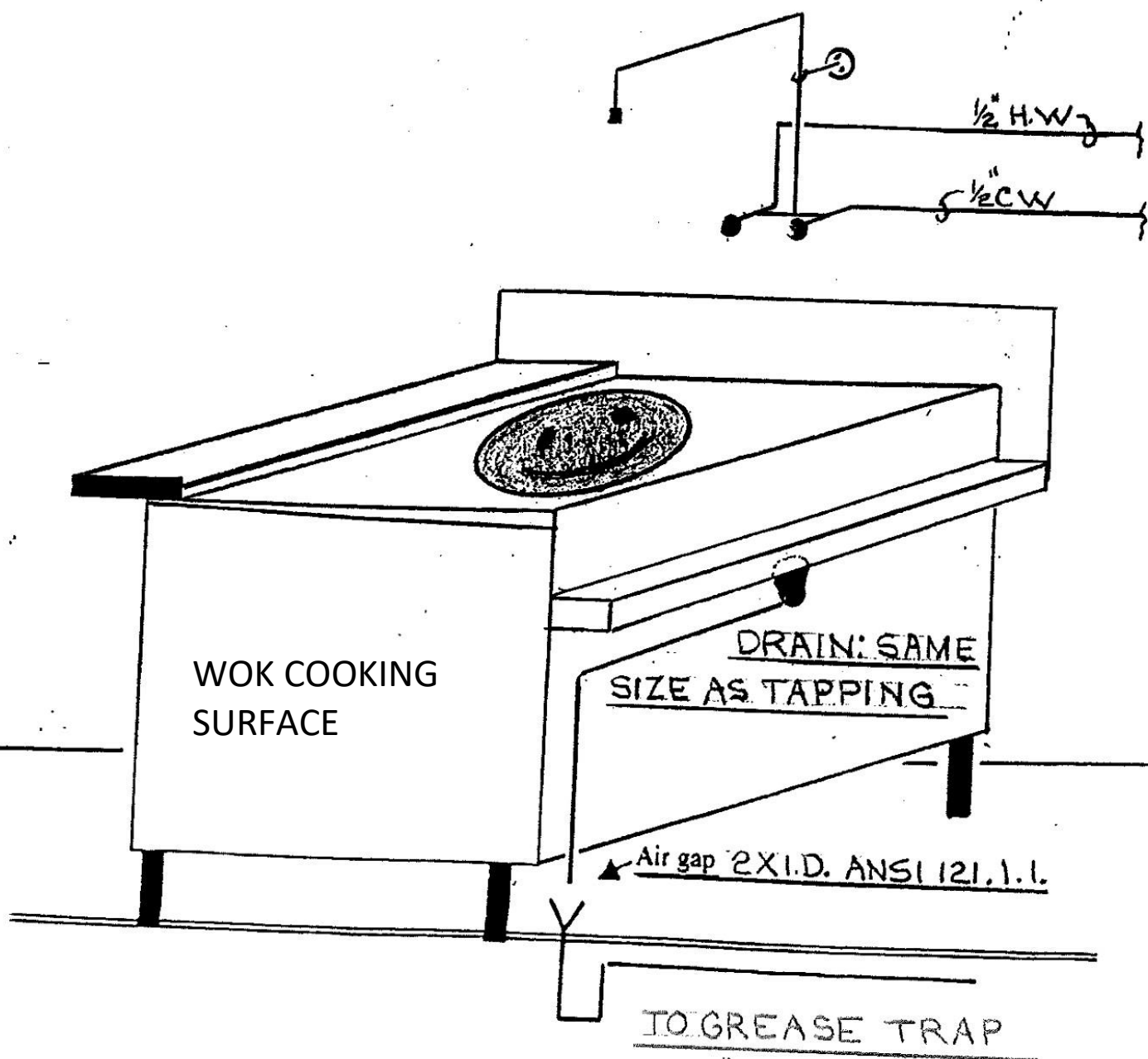
APPROVED METHOD OF BACKFLOW PROTECTION

See chapter on “**Hood Wash**” for proper backflow protection requirements.

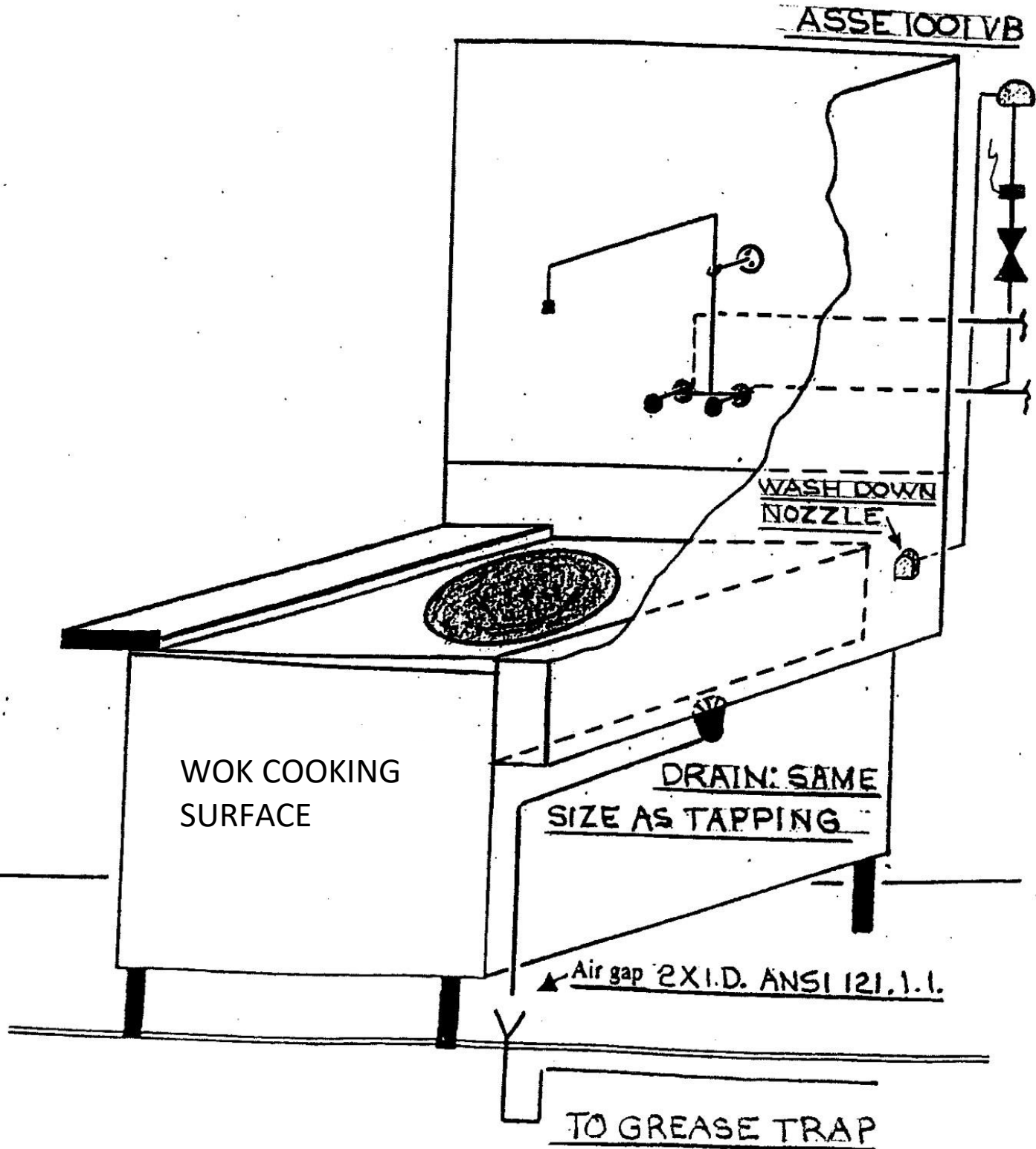
WOK COOKING SURFACE EXHAUST HOOD WATER WASH DOWN



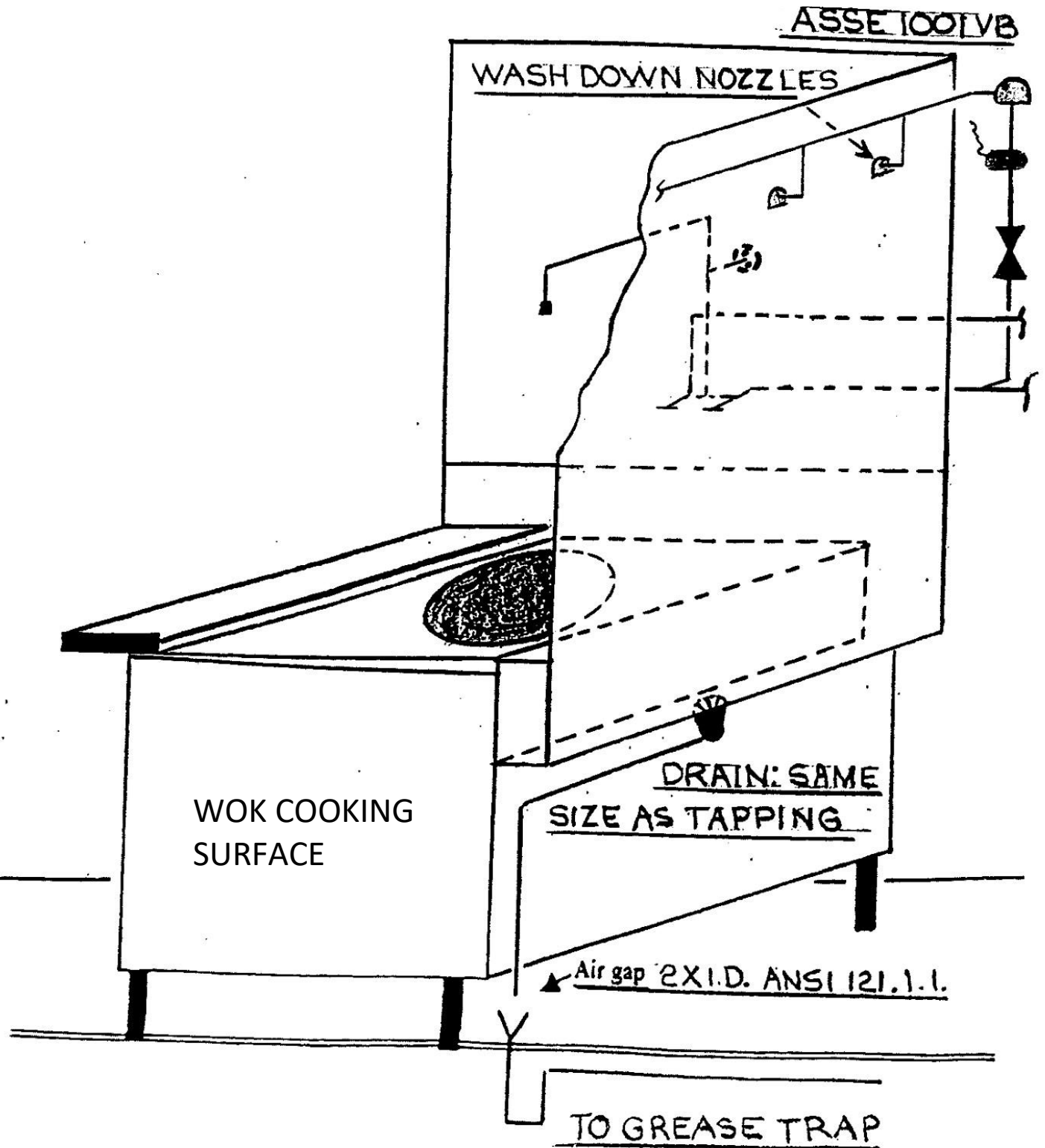
WOK COOKING SURFACE EXHAUST HOOD TOP WATER WASH DOWN



WOK COOKING SURFACE EXHAUST HOOD WITH WATER WASH DOWN



WOK COOKING SURFACE EXHAUST HOOD WITH WATER WASH DOWN



X-RAY & FILM PROCESSOR

SPS 382.41- Cross-connection control for **X-Ray & Film processors** is based on **high degree** of hazard for the protection of the potable water supply.

TYPES

There are **film processors** hooked up to the water supply and self-contained units (filled by hand).

APPROVED METHOD OF BACKFLOW PROTECTION

- | | |
|------------------|---|
| 1. ASME A112.1.2 | Air Gap |
| 2. ASSE 1001 | Pipe applied atmospheric vacuum breaker |
| 3. ASSE 1013 | Reduced pressure backflow preventer |
| 4. ASSE 1056 | Spill resistant vacuum breaker |

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